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Citrus Industry of Southern Africa

By J. Henry Burke, Marketing Specialist

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FOREWORD

In recent years, about three quarters of the United States orange exports to Europe have been shipped from April through October.

The Union of South Africa is our foremost competitor in Europe's summer orange markets. The South African orange, harvested from April to November, is a winter orange sold in Europe in the Northern Hemisphere summer.

This report of South African competition is made to assist the American citrus industry in its efforts to expand foreign markets for citrus and citrus products.

D. M. RUBEL, Director
Fruit and Vegetable Division

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September 1957

CITRUS INDUSTRY OF SOUTHERN AFRICA

By J. Henry Burke
Marketing Specialist
Foreign Agricultural Service

SUMMARY AND CONCLUSIONS

The citrus industry of South Africa grew to major importance during the period of high citrus prices following World War I. Overplanting and production resulted in 30 percent of the citrus acreage being abandoned in the 1935-39 period. South Africa is now in another postwar boom period.

From 1950 to 1955 total citrus acreage of exporters increased from 37,000 to 57,500 acres. The quantity of fruit that can be exported profitably will determine future expansion. Present acreage is about equally divided between Valencia and naval oranges. There are small acreages of lemons and grapefruit. Most citrus is grown on rough lemon root stock.

Production of oranges--8.5 million boxes in 1954--can reach 12.5 million boxes by 1961 and 15 million by 1964 from present plantings.

Citrus production hazards in South Africa include flood, drought, hail, and frost. Tristeza is present in all producing areas. The fruit fungus "black spot," scale, the false codling moth, and the Natal and Mediterranean fruitflies are major pests.

Wages are low. The cost of imported packing materials, trucks, and tractors is high. In 1955, the cash costs of orange production were estimated at 56 to 70 U.S. cents per box on the tree. Cash costs f.o.b. South Africa were estimated at $2.15 to $2.29 per packed box; and at United Kingdom ports they ranged from $3.78 to $3.92 per box.

On the tree returns to South African growers in 1955 averaged $2.34 per box for oranges, $2.46 for lemons, and $3.10 for grapefruit.

The citrus industry receives assistance from the government in the form of nominal land taxation, subsidies on irrigation projects, and special domestic freight rates on export fruit. Ocean freight rates from South Africa to Europe are the lowest in the world.

All exports are under the control of the Citrus Board. The South African Co-operative Citrus Exchange, Ltd., the operating organization of the Citrus Board, controls export fruit until it is sold in European markets. Practically all exports are consigned. Returns are pooled, thereby removing any incentive for growers or packers to improve quality.

Total orange exports were 5.7 million boxes in 1954. They are expected to increase to about 7.5 million boxes by 1961 and 8.5 million by 1964. Nearly all the increase will go to continental Europe. The United Kingdom already absorbs 60 percent of present exports. Even with increased shipments, South Africa will probably have surplus supplies of oranges by 1961.

When citrus becomes surplus in the Union, the subsidiary producing areas such as the British protectorate of Swaziland, the Portuguese territory of Mozambique, and Southern Rhodesia may disassociate themselves from the Citrus Exchange and become competitors for shipping space and European markets.

Domestic consumption is low compared to other citrus producing areas. South Africans do not drink much orange juice.

The outlook is for costs of production and ocean freight to rise. Higher ocean freight rates may raise cash costs at United Kingdom ports to about $4.50 per box by 1961.

Increasing quantities of large-size ordinary quality South African oranges will be a major competition for California fruit in European markets. The best way to meet this competition will be to ship high quality fruit. As competition increases, South Africa will be unlikely to maintain its controlled marketing system in continental Europe. Importers receiving increasing quantities of consigned South African fruit will probably be less willing to purchase fruit at their own risk. Low returns will probably make the export of small-size South African Valencias unprofitable. Lower summer orange prices in Western Europe may be expected by 1961.

South Africa will continue to have a small processing industry, packing about 100,000 cases of single strength juice and 50,000 cases of grapefruit sections annually. The most competitive items will be marmalade, citrus peel, essential oil, and preserved concentrated orange juice. Nearly all of these products will be sold to the United Kingdom.

High acidity and low solids make South African oranges undesirable for processing. They can never compete with Florida in a free market either on a quality or a price basis. Also, in processing South Africa abandons the seasonal advantage which created the fresh fruit industry.

The Union of South Africa will be a formidable competitor of the United States for the summer orange market in Western Europe unless climatic disaster or political instability reduces its export potential.

HISTORY[1]

Citrus was introduced into South Africa in 1654 during the time of the Dutch East Indian settlement, now Capetown. It was first exported in 1907, when 3,000 boxes were shipped to London. Exports increased gradually and in 1916 about 65,000 boxes were shipped abroad. During 1917 and 1918 exports were interrupted by World War I. They were resumed in 1919, when the high postwar prices in Europe and the availability of refrigerated shipping space stimulated new plantings. Exports increased to over 4.7 million boxes by 1939.

The industry expanded too rapidly. Returns on packed citrus averaged about $3.32[2] per packed box f.o.b. the packinghouse in 1928. As increasing quantities of fruit became available from new plantings returns to the grower decreased, averaging about $2.41[2] per packed box in 1931-34 and only about $1.64[3] in the 1935-39 period. As a result about 30 percent of the total citrus trees were abandoned. During the 1940-49 war period citrus was purchased by the Ministry of Food and the volume of exports was restricted. Prices on shipped fruit were higher than the prewar level, averaging about $3.16 per packed box f.o.b. the packinghouse. More normal trade was reestablished in 1949 and exports increased rapidly, reaching 3.7 million boxes in 1952. Returns to growers rose also, to an average of $4.26[3] per packed box f.o.b. the packinghouse. Citrus growers, encouraged by high prices, rapidly expanded their groves after 1949 and were still expanding in 1956, repeating the expansion which followed World War I.

ACREAGE

In 1955, a tree census of citrus acreage of exporters in the Union of South Africa was completed. This census showed the total to be about 57,500 acres. The breakdown of this total is shown in table 1. Planting has continued at a rapid rate. Observations made in the field indicate that the total planted area may be understated by as much as 15 percent. The total in 1956 was probably nearer to 70,000 acres, including exporters and nonexporters and bearing and nonbearing trees.

In 1948, the Co-operative Citrus Exchange made a comprehensive survey of the potential citrus areas in the Union. The findings of this study are given in table 2. The largest

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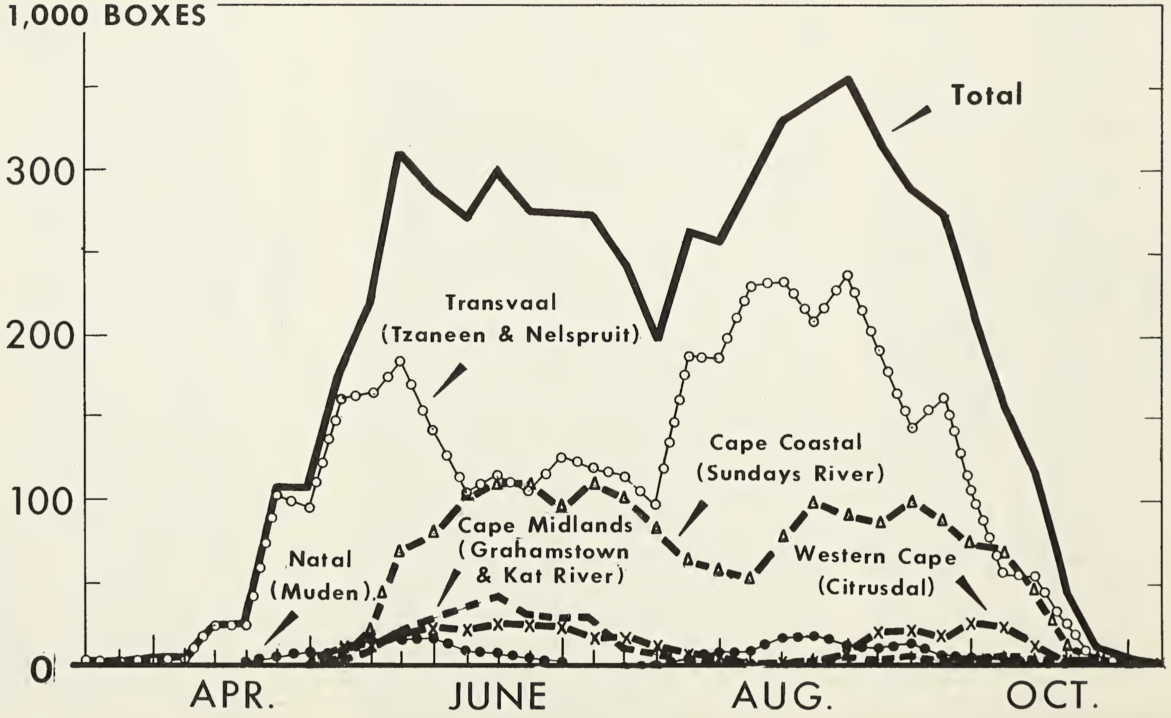
[1] "The Controlled Marketing of Citrus Fruit in South Africa," "To Plant or Not to Plant Citrus Trees" both by Dr. Winston J. S. Allwright and "An Economic Survey of Citrus Farming in the Union of South Africa" by Dr. N. A. B. Bestbier.

[2] Converted at pre-devaluation rates of exchange.

[3] Converted at the post-devaluation rate of exchange of about $2.80 to the pound.

WEEKLY RAIL SHIPMENTS OF CITRUS FOR EXPORT, UNION OF SOUTH AFRICA, BY AREA OF PRODUCTION, 1955



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potential area is in the Tzaneen district in the Northern Transvaal and the second largest is in the Nelspruit district in the Eastern Transvaal. These two areas are the earliest producing districts and are sometimes referred to as the "Florida" of the South African citrus industry. A major expansion of plantings could also be made in the Sundays River and Patentie districts of the Eastern Cape Coastal region.

Field observations confirm that this is a reasonable estimate of potential citrus areas in the Union. There are large areas of sandy loam soils in suitable climatic zones near undeveloped water sources in all these districts.

According to statistics, present citrus acreage could be expanded by over 250,000 acres in the future. Such an expansion is not even being considered, but this shows that the factors limiting the size of the South African citrus industry are economic, not natural. The quantity of fruit which can be sold at a profit will determine the future size of the industry.

PRODUCTION

Annual production of oranges, lemons, and grapefruit from 1943 to 1954 is shown in table 4. Future production of all citrus in the Union will increase rapidly as plantings made since 1950 come into bearing. The 1961 crop could amount to 12.5 million boxes of oranges, 500,000 boxes of lemons, and 600,000 boxes of grapefruit.

Production may be expected to increase for some time. By 1964, a production of 15 million boxes of oranges and 750,000 boxes of lemons is possible. Grapefruit production will increase more slowly because large areas of present plantings are affected with disease (stem pitting) which will take considerable acreage out of production each year.

PRODUCING AREAS

South Africa's major producing areas are the Northern, Eastern, and Western Transvaal, Natal, and--in the Province of the Cape of Good Hope--the Cape Midlands, the Eastern Cape Coastal area, and the Western Cape. Each area is identified by Province and by district as it is discussed.

These observations were made in May and June 1956.

NORTHERN TRANSVAAL

The Northern Transvaal is the second largest citrus area in the Union of South Africa. In 1955, 24 percent of the total acreage was grown there. The citrus district may be divided roughly between the Zebediela Estate in the high interior, where citrus is grown at elevations of over 3,000 feet and the low areas near Tzaneen, where the elevation is 1,000 feet or less. Commercial plantings are scattered at Politsi, Letaba, and Tzaneen. Other small producing districts are at Potgietersrus, Sibasa, near Messina, on the Njelele and Limpopo rivers, and Louis Trichardt.

Zebediela Estate

This citrus planting of about a half million trees, said to be the largest citrus grove in the world, grows 10 percent of all the orange trees in South Africa. The first plantings were made in 1918, continued for 11 years, and covered approximately 9 square miles. About half the trees are Valencia and about half navel oranges. Most have reached their maximum production and some are declining and being removed. The Estate has found it impractical to replace old trees within the grove because it is difficult to give the new replants proper care. Therefore new areas are planted on adjacent virgin land.

Season and Climate.--At Zebediela citrus blooms in September in years of normal weather. The area is subject to severe climatic hazards--wind, drought, and especially hail. To represent the climate in the high interior, data from Pietersburg are given in appendix table 43. These data are fairly representative of the citrus districts.

Cultural Conditions and Practices.--New acreage is planted with 154 trees per acre. When the trees come into bearing and begin to crowd, groves are thinned to 103 trees per acre. This leaves hedgerows, which are later thinned to 53 trees per acre.

Considerable efforts have been made to supplement existing water supplies. Large spreading (or storage) grounds have been created, where water is collected during periods of rainfall. In the past 4 years over 200 wells have been drilled, some to a depth of 300 feet. The largest produces 500 gallons of water per minute. Forty of these wells have pumps. The rest can be used with auxiliary water-lifting devices. Since the spreading grounds have been created, the water table is returning to normal.

Zebediela is irrigated by a basin system. There are at least four basins around each tree. All rainfall is kept in the grove with no run-off. Alternate irrigation is practiced during periods of water shortage. Irrigation water is applied liberally for deep penetration and to minimize the loss of water through surface evaporation.

Native men and women hand-cultivate groves in order to maintain permanent basins. Also, in old groves, planting is so dense (19' x 19') that mechanical cultivating would be impossible. No pruning is done.

Trees are fertilized by applying 1-1/2 pounds of nitrogen per mature tree in three applications per year. In recent years ammonium nitrate has also been used. In parts of the grove there are some zinc and magnesium deficiencies and a potassium deficiency is quite general. The entire property is sprayed with zinc and copper every 2 years and some phosphates are also applied to the soil.

Pests.--Major citrus pests, in order of importance, are red spider, measuring worm, cotton bollworm, California red scale, soft brown scale, and false codling moth. The cotton bollworm is unusual among these pests. It eats young fruit, reducing production. The measuring worm is a new pest which has become widespread.

Parathion spray is used in September and October to control pests. Some aerial dusting is also being done. The Estate laboratory is carrying on research to discover a parasite to control the measuring worm. In 1956 a new wasp seemed promising for this purpose.

Diseases.--Zebediela has a fruit disease called "stem end browning" which has affected small-sized Valencia oranges by causing the peel at the stem end of the fruit to dry and turn brown. In 1956 this disease was also found on some shipments of navel oranges. It causes serious economic loss because it develops in transit to port and results in rejection of the affected fruit. Its cause is as yet unknown. At one time it was thought to be a boron deficiency, but treatment to correct this failed to control the disease. One line of thought is that it is a symptom of the general decline of old trees.

Production.--Zebediela is trying to maintain production by new plantings, but it is unlikely that the new plantings can compensate for the decline in production as the older groves die out. It appears certain that the best that can be expected is that production levels will be maintained.

Packing.--The fruit is packed in one very large packinghouse with a capacity of 16,000 boxes per day. It is served by a narrow gage railroad that brings the fruit from the grove. Each evening a 30-car trainload of fruit is shipped to Capetown. It takes an average of 6 days to reach port and requires at least 500 railcars to serve Zebediela. All fruit is shipped in unrefrigerated cars and fruit for the local market is often shipped in cattle cars. In 1956, the packinghouse installed a new waxing process in the hope of reducing the loss of fruit from decay in transit.

Nurseries.--The Estate raises its own nursery trees and is using rough lemon root stock. Growers are considering sweet orange root stock for future, use, however.

The appearance of citrus trees varies in each South African district because of differences in soil, climate, and quality and availability of irrigation water. Upper left, an irrigated grove in Rustenburg. Upper right, a typical grove of the Grahamstown area. Left, a typically well cared-for grove at Sundays River. Lower left, a Valencia grove at Patentie. Lower right, a young grove, representative of the drought and frost area of Muden.

Some Meyer lemons are grown in Tzaneen. Terraced planting aids growth.

The Mazoe Estates near Salisbury produce some lemons for export.

In Nelspruit the average orange production is six boxes per tree, but yields of nine boxes per tree are not uncommon.

Tzaneen-Letaba District

This is a tropical area of varied agriculture and most citrus growers produce other crops. Conditions differ widely. Some groves are planted on sloping hillsides and others are on level ground. Soils range from sandy loams in the low areas to heavier textured red soils in the higher areas. Plantings on high ground are usually surrounded by eucalyptus trees.

Malaria was a problem until about 1950. Citrus development has increased more rapidly since the disease was brought under control.

Season and Climate.--This is one of the earliest districts in South Africa. Citrus normally blooms between Aug. 25 and Sept. 15. Navel oranges are harvested in April and May. Valencias may be harvested in June when sprayed with calcium arsenate, which advances maturity.

Tzaneen is a part of the "Florida" of the South African citrus industry. The climate in the low producing areas is similar to the climate at Pusella, shown in appendix table 43. Most of the harvest season (May-September) is dry, with less than an inch of rain per month. The dry season continues until spring in September when the trees begin to bloom. The area has no frost hazard.

Cultural Conditions and Practices.--Groves are planted about 72 trees to the acre. The old groves at Tzaneen are planted in square patterns unsuited to sloping terrain. Some of the newer groves, however, are on terraced land and most are contour-planted to facilitate care and irrigation and to prevent erosion.

In the past, citrus was raised primarily on rough lemon root stock, but sweet orange stock is being used to some extent in new plantings. The ratio is about one-third sweet orange to about two-thirds rough lemon stock. Near Tzaneen, navel oranges grown on sweet orange root stock, in a grove which contained adjacent trees of similar age and bud source grown on rough lemon root stock, showed a marked difference in the fruit quality. The oranges raised on sweet orange root stock had a higher peel color, smaller center core, and a better interior color, texture, and taste. Sweet orange is still unpopular with most growers, however.

Rainfall varies from heavy in the high areas to very modest (about 20 inches per year) in the lower areas. The high properties, where heavy rainfall makes irrigation unnecessary, are operated as a turf culture to prevent erosion. The lower groves are cultivated with tractors and are clean-cultivated in winter. Irrigation water is adequate where needed and is applied by the basin method, although there is a growing interest in the sprinkler system. Irrigation is usually practiced from July to October.

Pests.--The major pests in order of their importance are California red scale, soft brown scale, the Mediterranean fruitfly, and the Natal fruitfly. Others are false codling moth, thrip, and red spider.

The Northern Transvaal area has a complicated pest control program which requires a great deal of labor. The scale pests are controlled by the use of parathion, malathion, and sometimes oil sprays. Flies are controlled by applying bait on two sides of the trees with a brush once a week and after each rain. This bait consists of a poison--such as parathion or "turgon"--in a sugar solution. False codling moth is controlled by picking the stung fruit out of the grove and destroying it. The two fruitflies and the false codling moth are fruit-destroying pests and can seriously reduce yield if not controlled.

Diseases.--There are several serious citrus diseases in the area. The most important is the fruit fungus "black spot." Others are melanose, which occurs in the spring--usually August or September--and a dry root rot, which affects trees on heavy soils that have been over irrigated.

"Black spot" is caused by the fungus Phoma Citricarpa McAlp[4]. It exists in Australia and Japan and was discovered in Natal in 1929. It has since spread to other areas and is now one of the most serious diseases in the Northern and Eastern Transvaal. The spores of the fungus infect the fruit when it is less than 2 inches in diameter. No signs of the infection are visible until the fruit begins to mature and color. Then black spots appear on infected fruit on the sunny side of the tree. The fungus develops under high temperatures. Warm fall weather can increase "black spot" damage. If infected fruit is packed and shipped the spotting will increase and spread during shipment. Holding fruit on trees is limited because "black spot" increases rapidly on tree-stored mature fruit.

Experiments indicate that copper sulfate sprays are necessary for effective control of "black spot." Three sprays per year with the standard Bordeaux mixture for oranges and four sprays per year for lemons are recommended. This results in about 80 percent clean fruit.

Varieties.--Past plantings have been mostly to Valencia oranges. Valencias have a high acidity at the beginning of the season and the resulting soluble solids to the acid ratio delays picking because the fruit will not meet the minimum export standard of a 7 to 1 ratio.

There is increasing interest in the Hamlin and Florida pineapple oranges, which produce well under local conditions. The Hamlin is preferred because the pineapple variety has too many seeds. Considerable quantities of a local type called the "Letaba early" are raised as a midseason variety on one property.

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[4] "The Black Spot Disease of Citrus" by Dr. Vincent A. Wager.

Lemon production is increasing. The Villafranca variety produces rough fruits and is considered the least desirable. The Eureka is more satisfactory, but the fruits tend to be large. Some Meyer lemons are being planted and the fruit produced is excellent in both texture and size. It has not been determined how the Meyer lemons will be accepted in export markets, however.

Production. --In this area, citrus grows rapidly, yields are high, and fruit tends to be large. One block of 10,000 Valencia orange trees has produced an average of 10 packed cases per tree annually over a period of several years. Young groves just coming into bearing (6 and 7 years old) produced three to four packed boxes per year. (The average yield is less than four boxes per tree annually.)

In considering yield, the life of the tree and the quality of the fruit produced must also be taken into account. Citrus growers have found that orange trees in this area have a rather short commercial life--only 20 to 25 years. Lemon trees may be productive for an even shorter period.

Packing. --Several very large installations do the packing. Estate packinghouses have a capacity of 6,500 packed boxes of Valencias, or 7,500 boxes of navel oranges per day. In addition, a large cooperative packinghouse at Politsi has a capacity of 8,000 packed boxes per day. Additional large packinghouses are planned in the next few years to handle the increasing crop.

In 1956 the fruit was being washed with fungicides before packing. No wax was being used.

Packed fruit is shipped by rail to Capetown. The trip from this part of the Transvaal requires an average of 9 to 10 days.

EASTERN TRANSVAAL

The Eastern Transvaal, the third most important citrus district, contained about 11,700 acres of citrus in 1955--about 21 percent of the total citrus area in the Union of South Africa.

Primary producing districts are located near Nelspruit, including Karino, Plaston, and White River. Plantings of grapefruit and oranges are being made at lower elevations in the more humid climate near Hectorspruit, Althorpe, and Schoemansdal.

Nelspruit

The major citrus plantings are in the Crocodile River Valley on both sides of the river near Nelspruit. Most of these valley plantings are irrigated with gravity water.

On the north of the valley the citrus areas of Karino, Plaston, and White River are located at an elevation of about 500 feet above Nelspruit. The Nelspruit district is primarily composed of large citrus holdings, but 10 to 25 acre groves are common in the high areas.

The groves are nearly all planted on sloping ground and the area has trees, shrubs, and vegetation much like Santa Barbara, California.

Malaria, brought under control in the last 5 years, has been a factor in citrus development.

Season and Climate. --This is an early district. The main citrus bloom occurs between Aug. 15 and Sept. 15 in years of normal weather. From this bloom, navel oranges are harvested from Apr. 1 to June 15 and Valencias, from May 15 to Oct. 15. Maturing can be advanced by as much as 2 weeks to a month by spraying the trees and fruit with calcium or lead arsenate. Part of most groves is sprayed with arsenate each year.

Lemon trees bloom several times and are harvested several times throughout the citrus season. The largest harvest is in the 3-month period April-June. Harvesting continues on a smaller scale through July and August. Another crop is usually ready in November and December.

Grapefruit is harvested from about Apr. 1 to June 15.

The climate is warm and humid. Weather statistics are shown in appendix table 43. The spring bloom is preceded by 4 months of low rainfall and, in times of drought, this may reduce the set of the fruit. The heaviest rains occur in summer. The region has no frost hazard, but it has had hail damage. This is another part of the "Florida" of the South African citrus industry.

Cultural Conditions and Practices. --Planting density is usually about 75 trees per acre. In most groves, clean mechanical cultivation is practiced in the dry season (May-September) and a cover crop is raised during the rainy season. Little or no pruning is done on either lemon or orange trees, except to remove dead wood.

The entire area is irrigated--on heavy soils three times a year and on light soils about five times. In normal years groves are irrigated in July, August, November, December, January, and February, but time of water application depends on seasonal rainfall. Irrigation water is primarily from gravity sources and is applied in basins.

Pests. --Major pests are California red scale, soft brown scale, Mediterranean and Natal fruitflies, red spider, false codling moth, bollworm, and thrip. These pests are controlled by one spraying of parathion or malathion per year. In some groves, however, it takes two applications of pesticides to control the red spider.

Diseases. --The major fruit disease problem is "black spot." A new waxing process in the packinghouse has been

TABLE 1.--Citrus fruits: Total plantings of exporters in the Union of South Africa, by area and variety, 1955

Area	Navel oranges	Valencia oranges	Other sweet oranges	Grapefruit	Lemons	Total
	Acres[1]	*Acres*[1]	*Acres*[1]	*Acres*[1]	*Acres*[1]	*Acres*[1]
Western Transvaal:						
Rustenburg	1,396	1,611	101	2	155	3,267
Northern Transvaal:						
Zebediela-Tzaneen	5,102	7,935	438	49	433	13,958
Eastern Transvaal:						
Nelspruit	2,814	6,449	881	449	1,120	11,712
Natal:						
Muden	801	1,153	120	404	1	2,479
Cape Midlands:[2]						
Kat River-Grahamstown	4,341	773	115	136	45	5,411
Eastern Cape Coastal:						
Sundays River-Patentie	6,377	5,503	1,011	2,034	419	15,345
Western Cape:[3]						
Citrusdal	2,741	2,335	12	55	225	5,368
Total 1955	23,572	25,759	2,678	3,129	2,398	57,540
Total 1950	15,080	18,503	1,125	1,841	770	37,321
Percent increase over 1950	56	39	138	70	211	54

[1] Calculated at 83 trees per acre based on report of Dr. N.A.B. Bestbier.
[2] Also referred to as "North Eastern Cape."
[3] Also referred to as "Western Province."

South African Co-operative Citrus Exchange, Ltd.

TABLE 2.--Union of South Africa: Estimate of potential citrus acreage, 1948

Citrus districts	Areas where existing inadequate irrigation facilities could be made adequate		Undeveloped areas suitable to citrus
	By growers	By government projects	
	Acres	*Acres*	*Acres*
Northern Transvaal	33,500	78,000	6,350
Western Transvaal	4,000	1,200	5,750
Eastern Transvaal	16,900	34,600	13,125
Natal	190	740	653
North Eastern Cape	2,000	9,800	3,100
South Eastern Cape	---	47,600	13,190
Western Cape	3,100	10,500	1,730
Total	59,690	182,440	43,898

Survey made in 1948 by the South African Co-operative Citrus Exchange, Ltd.

TABLE 3.--Transvaal: Costs of production, picking, and packing, 1954

Item	Fruit for export[1]	Fruit for domestic use[2]
	U.S. dollars	*U.S. dollars*
Production cost, including picking	0.63	0.26
Packing costs:		
Packing material	.86	.09
Other packing costs[3]	.18	.07
Total	1.04	.16
Total[4]	1.67	.42

[1] Per 70-pound export box.
[2] Per 30-pound mesh bag.
[3] Includes packinghouse charges which amount to about 10 cents per box.
[4] f.o.b. packinghouse.

TABLE 4.--Union of South Africa: Total citrus production by variety, 1943-54

Year[1]	Oranges[2]	Lemons[3]	Grapefruit[4]
	1,000 boxes	*1,000 boxes*	*1,000 boxes*
1943	5,407	41	328
1944	5,982	31	493
1945	4,448	94	502
1946	5,472	116	565
1947	5,750	133	614
1948	6,167	141	505
1949	6,730	128	557
1950	6,471	147	578
1951	5,843	122	358
1952	7,168	118	517
1953	8,514	122	466
1954	8,626	147	443

[1] Crop year - the year of bloom.

[2] Includes out-of-season citrus production and estimated production of non-Citrus Exchange members. 70-pound boxes.

[3] 76-pound boxes.

[4] 80-pound boxes.

Reports of the Citrus Marketing Board of the Union of South Africa.

TABLE 5.--Grahamstown: Estimated cash cost of operating an orange grove, 1956

Item	Cost per tree
Irrigated grove:	*U. S. dollars*
Taxes	---
Spraying, including material	0.14 - 0.21
Fertilizers	.14
Irrigation water	.14 - .21
Cultivation, tractors, etc.	.14
Labor and miscellaneous	.14
Total	.70 - .84
Total annual cost per acre[1]	65.80 -78.96
Unirrigated grove:	
Cultivation (3 years)	.42
Labor and miscellaneous (3 years)	.42
Total	.84
Total annual cost per acre[1]	26.00

[1] Computed at the average planted density of 94 trees per acre.

TABLE 6.--Cape Province: Estimated cash costs of operating a citrus grove, 1955

Item	Cost per acre
	U.S. dollars
Labor, including tractor driver, picking, cultural, and medical expenses of natives	43.28
Tractor (running expenses and depreciation)	23.16
Trucks (running expenses and depreciation)	15.93
Repairs to buildings	12.21
Water for irrigation	9.08
Fertilizer	40.83
Pest control	10.01
Gasoline for water pump	.19
Insurance	.28
Miscellaneous	.54
Salaries of supervisors	21.17
Total	176.68

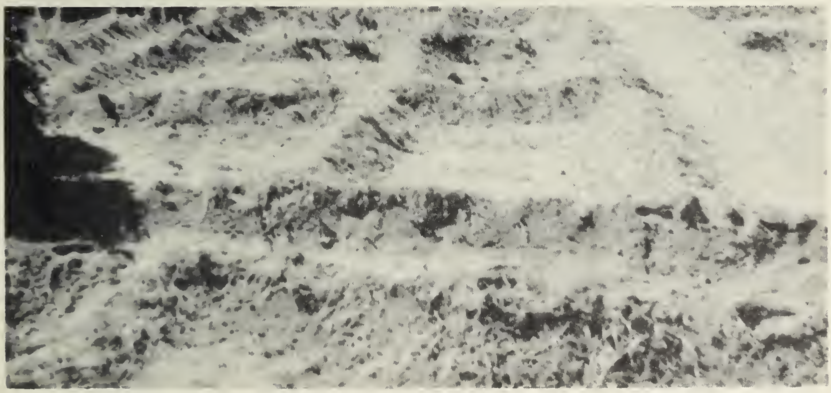
Eucalyptus trees serve as windbreaks to protect citrus plantings in Tzaneen.

Orange plantings are grafted on rough lemon root stock at the Mazoe Estates in Southern Rhodesia.

Nursery trees are in great demand. In 1956 nurserymen were taking orders for 1959 delivery.

Vital irrigation construction is underway in the Sundays River district. In the past lack of water has limited citrus development.

Young citrus trees are sometimes replanted in old groves in the Tzaneen area.



Permanent basins store irrigation water on the Zebediela Estate in the Northern Transvaal.

designed to control the spread of "black spot" in packed fruit. It is still in the experimental stage. Meanwhile, the disease is increasing. During the 1956 season, picking was disrupted in the infected groves.

Another major citrus disease is stem pitting which affects grapefruit. This is a virus transmitted by propagation. Melanose affects fruit in some sections of high rainfall. And dry root rot affects the life of the trees on heavy soils.

Lemon trees are subject to "decline disease," which is probably caused by virus complexes.

Production.--Valencia orange yields in the Eastern Transvaal are good. Some mature Valencia groves have averaged as much as nine packed boxes per tree and young Valencia trees (7 to 8 years old) may yield six packed boxes per tree. (The average yield is six packed boxes per tree.) A 30-year-old navel orange grove has averaged a yield of 9 field boxes (55 pounds each) per tree over a number of years.

Lemon production is also good. One 10-year-old Eureka grove produced an average of 10 to 12 packed boxes per tree annually. (The average yield is slightly over 2-1/2 boxes per tree.) Lemon trees decline quickly, however, and have to be replaced about every 15 years.

Grapefruit tends to be small in size and yields average about 1-1/2 boxes per tree.

Nurseries.--Large nurseries are registered commercial operations, but many small private nurseries produce trees for specific properties. Demand for young trees is so great that in 1956 nursery production was sold out through 1958 and orders were being taken for trees to be delivered in 1959. About 53 percent of the plantings are Valencia oranges; 25 percent, navel oranges; 8 percent, midseasons; 6 percent, grapefruit; and 8 percent, lemons.

Nursery practices are good. Transplantings are made by the bare root method. Growers agree that sweet orange root stock trees are more difficult to establish than rough lemon root stock. Lack of care in transporting and handling trees may cause part of the planting difficulty. Sour orange root stock cannot be used because the trees die within a few years. "Quick decline" is apparently present in all South African citrus areas.

The price of nursery trees in 1956 was moderate despite the large demand. Orange trees with 1 year to 18-month-old buds were being sold in quantity at prices ranging from 63 to 66 equivalent U.S. cents each. Lemons were quoted at 91 cents each. Some of the midseason varieties--as the Tomango orange sweet stock--were available, but at prices as high as $1.40 per tree.

It is evident from the large amount of nursery business that the citrus area in the Eastern Transvaal will continue to expand rapidly.

Costs

Many of the citrus groves in the Transvaal are in rural areas near native reservations. The industry draws its labor force from these sources. Many operational problems are involved in training and housing these often primitive people.

One citrus property furnishes food, housing, and water for each worker family. The ration of food includes 2 pounds of cornmeal, 3 pounds of meat, and some vegetables per worker, each week. A medical clinic is operated, schools are provided for the native children, and a store is available where employees can buy supplies at cost. All of these facilities are operated on a large scale. It is estimated that they cost the grower about 14 cents per worker per day. In addition to these facilities workers usually receive the use of a piece of land where they can raise some produce and a few chickens. All properties do not furnish as complete facilities as outlined, but housing and a food ration are almost always a part of wages. Land and housing are often important factors in obtaining native labor.

The labor force on some citrus properties is very large. One plantation employs 2,100 men and over 1,500 women. Wage rates must be considered in the light of the facilities furnished. Women field workers receive about 28 cents per day and men, about 35 cents.

Native women packers in the Transvaal receive about 1 U.S. cent per 100 oranges packed and may pack 50 boxes a day and some good packers of large-sized fruit may pack up to 100 boxes. They may earn from $11.80 to $14.00 per month.

The wages for men employed in packinghouses vary according to the experience and nature of the work. A beginner might earn 24 cents per day, a proven worker, 36 cents, and a semi-skilled worker (such as one operating a machine) 42 cents.

A few skilled office clerks earn as much as $42.00 per month.

Some plantations make provisions for aged workers. They are given easier work and are paid 42 cents per day.

The costs of production and packing on one citrus estate in 1954 are shown in table 3. Packing materials and farm machinery must be imported.

In years of small crops, unit costs are higher because the cost of maintaining a grove and packinghouse are largely fixed expenses.

WESTERN TRANSVAAL

The Western Transvaal is the second smallest citrus district in South Africa and in 1955 contained about 3,200 acres --about 5 percent of the total planted area.

Most of the production is at Rustenburg. There are some scattered plantings at Wolhuterskop, Marikana, and Koster.

Rustenburg

Rustenburg is located in the interior, over 350 miles from the coast, at an elevation of about 3,500 feet. It produces Valencia and navel oranges in about equal quantities. There are small plantings of lemons. The Rustenburg groves on the slopes of the hills are reminiscent of the citrus area near Riverside, California. The district includes some of the best maintained groves in South Africa.

Season and Climate.--This is one of the latest maturing citrus areas in South Africa--the bloom occurs between Sept. 15 and Oct. 15. Navel oranges mature about May 1 and can be harvested until July 15. Valencias usually mature in late August and may be harvested until Jan. 1.

Rustenburg is one of the hottest citrus areas. Climatic data are shown in appendix table 43. A wide daily temperature variation in wintertime caused by the high elevation, results in high-colored fruit. The area is subject to cold south winds, hail, and drought. Windbreaks are used to protect the citrus trees. Frosts occasionally occur in July and low temperatures sometimes damage leaves and trees. There is little rainfall during the citrus harvest and spring follows 5 months of dry weather. Increased planting is limited by lack of water.

Pests.--The major citrus pests are red spider, California red scale, and concentric ring blotch. Other minor pests include the cotton bollworm, the false codling moth, the Mediterranean and Natal fruitflies, thrip, aphis, and a caterpillar called the orange dog. Purple and soft brown scales are sometimes found in the groves and budmite is increasing. The scale pests are controlled by sprays of parathion and oil applied in August and September.

Concentric ring blotch, the third most important pest, is caused by gray mites that concentrate from 800 to 900 per square inch on leaves and fruit. They mark the leaves and disfigure the fruit, making it unsalable for export. Damage from this pest was first found about 30 years ago, but it has only been important since the 1948-49 season. Rustenburg is the only area in South Africa bothered by this pest. It is very difficult to control. Recent experiments indicate that it can be controlled by two applications of lime sulfur spray. The first, applied in October or November, is a concentration of one part lime sulfur to 80-100 parts of water. It provides excellent control. A second spray is recommended for late December or early January, combining a mixture of 1 to 1-1/2 pounds of micro-sulfur to 100 gallons of water.

The sulfur spray can be combined with other pesticides. In the fall (April or May), general purpose sprays containing

3 pounds of malathion (25 percent), 1 pound of parathion (25 percent), 4 to 6 ounces of cystox, and 1-1/2 pounds of micro-sulfur per 100 gallons of water have been used successfully.

Production.--A good grove in this area averaged three packed cases of oranges per tree over a period of 15 years. Some exceptional groves yield over seven packed cases per tree.

Packing.--A large cooperative packinghouse is located at Rustenburg. The cooperative operates a small processing plant and also picks the fruit. Export fruit is shipped to Capetown by rail in unrefrigerated cars. The trip takes about 1 week. The area is not conveniently located for export, but it is the closest producing area to the major domestic markets of Pretoria and Johannesburg. In 1956 the packinghouse was waxing fruit experimentally.

NATAL

Natal is the smallest citrus area in South Africa. It contained only about 4 percent of the total acreage in 1955. Plantings are scattered. The high interior district at Muden near Greytown is the most important. Other commercial plantings are located near Weenen between Greytown and Ladysmith. New producing areas are being developed in Zululand in northern Natal. These new areas are at Nkwaleni near Eshowe, at Stylrand, near Louwsburg, on the Mkuzi River, and at Pongola near Swaziland. They are located at low elevations and have a climate similar to the Eastern Transvaal. About two-thirds of the new plantings are grapefruit and about one-third Valencia oranges.

Description of the district is limited to Muden, which is similar in appearance to Arizona and the oldest and most important producing area.

Muden Valley

Muden Valley is located on the Mooi River at an elevation of about 3,000 feet.

Season and Climate.--It is a late citrus area. Trees bloom in September and October. Navel oranges mature about May 15 and Valencias about Sept. 15 in normal years. Some growers spray a part of their Valencia groves with calcium arsenate to reduce acid. This practice advances fruit maturity by about a month.

Muden Valley has several climatic hazards, which make it a marginal citrus producing area. Hot dry winds affect the area in some years damaging both fruit and trees. It is also subject to fruit-damaging frost and hailstorms. Climatic data at Nietgedacht shown in appendix table 43 are representative of the Muden area.

Cultural Conditions and Practices.--Underlying most of the area, about 3 feet below the surface, is a layer of clay which stunts tree growth. In the past, trees were planted 24 feet apart, but this was too wide a spacing for the small trees produced. New plantings are in hedgerows about 12 feet apart, with 24 feet between the rows.

Groves are clean-cultivated in the dry winter months (May-October) and a natural weed cover crop is grown during the rainy season.

One of the limitations of the area is that the time of bloom is the driest time of the year. In drought years, when water for irrigation is insufficient, yields are lowered. Also trees bloom out of season because of drought-breaking rains. The resultant out-of-season fruit creates picking problems and, as the fruit colors, it is impossible to select the out-of-season fruit.

Varieties.--About 60 percent of the plantings are Valencia oranges and about 30 percent naval oranges. There is some production of an early seeded orange--a Valencia "sport" called the Muden early. It produces small-sized fruit which finds a good market during the navel orange season, when there is an abundance of large-sized oranges.

Pests.--The most destructive pests are California red scale and thrip. They are controlled by a single spraying with parathion each year.

Diseases.--There is some "black spot" in the Muden area. It is controlled by 3 applications of a copper fungicide per year.

Production.--This old citrus area is no longer of major commercial importance. The poor soil condition and climatic hazards combine to lower yields to not over 2 packed boxes per tree. New plantings probably will not improve conditions because they are not well planted and are subject to the same hazards.

Future citrus production in the Muden Valley will probably decrease. Natal's citrus future possibly lies in the newer areas in Zululand.

Costs

Local labor is employed in the groves and the packinghouses. Employees are provided with land where they may build a hut and raise crops. Each worker receives an allocation of cattle and goats each year, on a length-of-service basis. Employees divide their time about equally between the citrus work and work in their own gardens.

Cash wages are low. A field worker is paid $2.80 per month. Women packers receive 3-1/2 to 5 cents per 1,800 fruit. Men, working in the packinghouse, make about 35 cents per day.

Packed fruit is transported by truck 17 miles from Muden to the railway at Greytown.

Muden Valley growers indicate that the average cash cost of producing an acre of citrus is about $140 per year. Pest control costs are a large part of the total. In Valencia groves they are estimated at $42 per acre per year.

CAPE OF GOOD HOPE PROVINCE

CAPE MIDLANDS[5]

This area contained 10 percent of the total citrus acreage in 1955. The terrain is mountainous with pine forests on the ridges. The sloping hills near the valley citrus areas are covered with scrub brush. Citrus plantings are scattered, but the most important producing districts are along the Kat River near Fort Beaufort and in the Fish River area near Bathurst. Plantings are also located at Adelaide, Alice, King Williamstown, and Grahamstown.

The Kat River Valley

This is a navel orange producing district. Citrus is a sideline to many growers and few are entirely dependent on it for their farm income.

Season and Climate. --Bloom is from Sept. 15 to Oct. 15 and navel oranges are mature enough to harvest by late May in a normal season.

Kat River has a high climatic hazard. Strong winds necessitate growing windbreaks to protect citrus trees. Frosts and hail are also prevalent and damaging to fruit. The frost damage period is from about June 1 to Aug. 1. Low lying groves are harvested as early as possible to avoid frost damage. Climatic data for Fort Beaufort shown in appendix table 43 are representative of the Kat River area.

Cultural Conditions and Practices. --There is good quality water in the Kat River, which has its source in nearby mountains. The water is pumped from the river to the adjacent citrus plantings. Groves are clean cultivated with tractors.

Pests. --Major pests are the Mediterranean fruitfly, California red scale, soft brown scale, and thrip.

Production. --This is an area of low yields--about two packed cases per tree. It produces small-size navel oranges of good quality, however.

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[5] This area is also known as the North Eastern Cape.

TABLE 7.--Citrusdal: Estimated cash costs of operating a citrus grove, 1956

Item	Cost per acre	Item	Cost per acre
	U. S. dollars		*U. S. dollars*
Fertilizers	42.00	Cultivation, including labor and tractor	16.10
Pest control	31.64	Other expenses	14.00
Irrigation	14.00 - 42.00	Total	117.74 - 145.74

TABLE 8.--Mozambique citrus: Exports from the Port of Lourenco Marques by the South African Co-operative Citrus Exchange, 1955

Item	Exports	Item	Exports
	Boxes		*Boxes*
Oranges:		Grapefruit:	
Navels	473	Seeded	4,091
Valencias	22,329	Lemons	423
Other oranges	1,263	Tangerines	1,334
Grapefruit:			
Seedless	31,830	Total	61,743

South African Co-operative Shipping Service, Ltd. Report on Shipping, Clearing, and Forwarding, 1955, p. 1.

TABLE 9.--Citrus: A comparison of the rail freight rates for export and domestic citrus from indicated producing areas to specified export ports, Union of South Africa, 1956

Export port and producing area	Miles	Freight rate	
		Export fruit	Domestic fruit
		U. S. dollars per ton	*U. S. dollars per ton*
Lourenco Marques:			
Politsi (Tzaneen)	268	3.54	8.59
Nelspruit	127	3.10	5.34
Zebediela	489	5.35	11.84
Durban:			
Politsi (Tzaneen)	788	6.03	11.15
Nelspruit	578	5.60	9.75
Zebediela	670	5.76	10.22
East London:[1]			
Politsi (Tzaneen)	970	6.44	12.31
Nelspruit	887	6.26	11.84
Zebediela	853	6.17	11.61
Rustenburg	763	5.98	10.92
Port Elizabeth:[1]			
Politsi (Tzaneen)	1,017	6.54	12.54
Nelspruit	934	6.35	12.08
Zebediela	899	6.25	11.84
Addo	22	1.63	1.63
Patentie	60	1.86	1.86
Capetown:[2]			
Politsi (Tzaneen)	1,272	7.19	13.47
Nelspruit	1,189	6.96	13.24
Zebediela	1,155	6.86	13.01
Rustenburg	1,065	6.68	12.77
Citrusdal	131	[3] 3.10	[3] 3.25

[1] Plus $0.04 cartage per 100 pounds.
[2] Plus "crossover" of $0.02 per 100 pounds.
[3] Plus road motor service (hauling to railhead) of $1.09 per ton.

TABLE 10.--Oranges, lemons, and grapefruit: Average annual returns per packed box to growers for exports, 1946-55[1]

Year	Average f.o.b. returns[2]		
	Oranges	Lemons	Grapefruit
	U.S. dollars	*U.S. dollars*	*U.S. dollars*
1946	2.80	1.80	2.10
1947	3.15	1.65	2.30
1948	3.10	1.85	2.27
1949	3.31	5.21	2.55
1950	3.21	3.83	2.98
1951	3.72	3.97	3.36
1952	4.43	5.20	4.62
1953	3.57	5.03	4.27
1954	4.10	4.92	4.54
1955	3.60	3.72	4.36

[1] These data include at least 85 percent of total citrus returns. Not included are returns from non-exporters and out-of-season domestic sales of exporters.

[2] In 1956, the Citrus Exchange estimated the average cost of picking and packing, including packing materials at $1.26 per box. Deducting this amount gives the approximate returns to growers on the tree in 1955.

South African Co-operative Citrus Exchange, Ltd.

TABLE 11.--Navel and Valencia oranges: A comparison of returns per box, f.o.b. packinghouse by pool and grade, selected sizes, in the Union of South Africa, 1955

Pool	Navel oranges size 150[1]			Valencia oranges size 176[1]		
	Outspan	Choice	Standard	Outspan	Choice	Standard
	U.S. dollars	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*
1	4.62	4.74	4.54	4.05	3.98	3.91
2	3.76	3.57	3.59	3.41	3.21	3.23
3	4.25	4.21	4.08	3.58	3.23	3.35
4	---	---	---	2.92	---	2.38

[1] Sizes in which important quantities are packed. These data were chosen as being representative of the pattern of grower returns.

TABLE 12.--Lemons and seedless grapefruit: A comparison of returns per box, f.o.b. packinghouse by pool and grade, selected sizes, in the Union of South Africa, 1955

Pool	Lemons size 270[1]		Seedless grapefruit size 96[1]		
	Choice	Standard	Outspan	Choice	Standard
	U.S. dollars	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*
1	4.86	4.41	6.88	6.89	6.78
2	3.85	3.71	4.85	4.61	4.65
3	4.08	3.93	---	---	---

[1] Sizes in which important quantities are packed.

TABLE 13.--Citrus: Average costs of production and yields per bearing tree, Union of South Africa, 1948-50

Item	Transvaal			Natal (Muden)	Cape of Good Hope		
	Western (Rustenburg)	Northern (Tzaneen-Zebediela)	Eastern (Nelspruit)		Western (Citrusdal)	East Coastal (Sundays River)	Midlands (Grahamstown-Kat River)
	U.S. cents per tree	*U.S. cents per tree*	*U.S. cents per tree*	*U.S. cents per tree*	*U.S. cents per tree*	*U.S. cents per tree*	*U.S. cents per tree*
Costs:							
Depreciation	20	15	13	12	10	15	13
Repairs	8	8	6	4	3	6	6
Operating expenses:							
Mechanical power equipment	16	11	9	6	9	10	11
Draft animals	1	---	1	1	1	1	---
Labor	79	61	61	55	34	45	34
Packinghouse service	10	---	9	6	2	11	2
Cash expenses	42	60	49	44	42	33	18
Fertilizer, pest control, etc	---	---	---	---	---	---	---
	U.S. dollars	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*	*U.S. dollars*
Total costs:							
Per tree	1.76	1.55	1.48	1.28	1.01	1.21	.84
Per acre[1]	144.32	111.60	111.00	88.32	107.06	100.43	78.96
Field:							
Oranges:	*Boxes*[2]	*Boxes*[2]	*Boxes*[2]	*Boxes*[2]	*Boxes*[2]	*Boxes*[2]	*Boxes*[2]
Navels	3.7	3.8	2.0	2.2	1.5	2.4	1.4
Midseason oranges	3.7	2.5	2.5	2.7	4.7	2.5	.6
Valencias	3.4	3.9	3.9	3.0	2.4	3.0	1.5
All oranges (average)	3.6	3.8	3.4	2.9	1.9	2.7	1.4
Yield per acre (average)[1]	291.9	275.8	252.8	198.7	199.3	224.1	133.5
Lemons:							
All lemons	2.5	1.3	2.5	0	1.9	3.3	1.1
Yield per acre (average)[1]	203.4	92.2	190.5	0	203.5	274.7	99.6
Grapefruit:							
All grapefruit	2.8	3.9	1.5	3.6	3.1	3.2	3.3
Yield per acre (average)[1]	226.3	283.7	113.3	245.6	328.6	268.9	314.0
	U.S. dollars per box	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*
Average production cost:							
Oranges	.49	.41	.44	.44	.54	.45	.59
Lemons	.71	1.21	.58	0	.53	.37	.79
Grapefruit	.63	.39	.98	.36	.33	.37	.25

[1] Calculated at the average number of trees per acre in each producing area.
[2] 70-pound boxes.

An Economic Survey of Citrus Farming in the Union of South Africa, 1952, by Dr. N.A.B. Bestbier.

Grahamstown

Elevations range from 500 to 1,500 feet in this district. Plantings are scattered and production averages about 500,000 boxes of fruit annually. About 90 percent of the plantings are navel oranges and the remaining 10 percent are Valencia oranges, grapefruit, and lemons.

Season and Climate.--Citrus blooms from Sept. 15 to Oct. 20, and navel oranges are harvested May 15 to Aug. 15. It is possible to tree-store navel oranges in this district.

Severe droughts, high winds, and hail are climatic hazards. Low lying groves are subject to frost damage at blossom time in September. Sometimes fruit is frozen and the trees damaged in the winter months of July and August,

Cultural Conditions and Practices.--Nearly all citrus growers in the Grahamstown area engage in other farming activities--with citrus as part of other operations or as a sideline.

Soils are red on high ground and sandy loams on low land near the rivers.

Irrigation water is limited and is poor quality. Water that tests 670 parts per million sodium chloride is sometimes used. About 25 percent of the area is irrigated by overhead single jet sprinklers. Growers construct small dams and catchments to obtain irrigation water. Unirrigated groves produce crops only in years of high rainfall.

The groves are clean cultivated with tractors. Some new plantings are being made, but average expansion is slow because old groves going out of production offset new plantings.

Pests.--The false codling moth is a major pest and sometimes causes a 25-percent loss of fruit. Other pests include California red scale, mussel scale, thrip, soft brown scale, and the Mediterranean fruitfly. Some growers do not use any pest control measures, relying on biological control. Most growers, however, spray once or twice a year with parathion or an oil spray.

Production.--Yields are low--ranging from 5 packed boxes to one-fourth box per tree. Low yields are compensated for to some extent by the small size of the oranges. Small-size fruits usually bring higher prices than large sizes. The quality of the fruit is good and there is very little decay in exports.

Packing.--The fruit is clean when it comes from the grove, so no washes are used in the packinghouse. It is brushed mechanically, graded, sized, and packed. Oranges are wrapped in diphenyl treated paper. No wax was being used in 1956.

Costs

The yield of fruit on irrigated land is about two boxes per tree. The average cost of operating a grove in Grahamstown is shown in table 5. These costs are generous. Many growers do not spend as much as indicated for fertilizers or pest control. Growers who do spend the amounts indicated sometimes obtain a production of four packed boxes per tree, decreasing production costs proportionately.

About a fourth of the citrus at Grahamstown is planted on unirrigated land, where there is no pest control or fertilization and the only cost is for cultivation. A crop of two packed cases per tree every 3 years is average for these groves.

The Eastern Cape Coastal

This is the most important citrus area in the Union and contained about 15,000 acres of citrus in 1955--about 27 percent of the total South African citrus acreage. There are three primary producing districts--the Sundays River Valley from Addo to Kirkwood, the Gamtoos River Valley, where the center of the industry is near Patentie, and a major commercial planting on an estate near Uitenhage.

Sundays River

The Sundays River Valley is 3 to 6 miles wide and the groves are similar to those in California. Most of the soils are light sandy loams well suited for citrus. Some of the area has an underlying layer of heavier soil and some groves have developed a heavy plow sole.

Season and Climate.--The citrus season is much later here than in the Transvaal. Bloom normally occurs in October, with navel oranges maturing in June and Valencias, about the middle of August.

The climate is generally favorable. There is a wind hazard and most groves are surrounded by windbreaks for protection. In some years insufficient rainfall causes a water shortage, which results in damage to citrus trees. Frost occurs occasionally, but is not normally a problem. Complete weather statistics for this area are shown in appendix table 43.

Cultural Conditions and Practices.--Until 1945 Valencia and navel oranges were planted about equally. Most plantings since 1945 have been navel oranges. Plantings in 1955 consisted of about 40,000 navel orange trees, 10,000 Valencias, and about 15,000 Eureka lemons.

The limiting factor for the development of the Valley is irrigation water. An extensive government project to bring water from the Orange River is planned for the future. The quality of irrigation water is also a problem. At times of normal supply, the water contains 160 to 170 parts per million of sodium chloride and in times of water shortage the concentration may reach 220 parts per million.

There are some minor element deficiencies in the district and manganese and zinc are applied in sprays as a remedy.

Year-round clean cultivation is practiced in most groves. Tractors are used to cultivate all citrus groves in this area.

Pests. --Major pests are California red scale, mussel scale, soft brown scale, false codling moth, and the Mediterranean fruitfly. They are controlled by parathion or malathion. Some oil sprays are used for soft brown scale. Some groves are fumigated. Growers have found, however, that fumigating does not destroy the mussel scale.

Diseases. --Grapefruit production is decreasing because the "stem pitting" disease continues to destroy mature groves. Using nucellar seedlings may be the answer to control of this virus disease.

Packing. --Growers pick their own fruit and deliver it to the packinghouse. It is customary to "spot pick" fruit. Navel oranges are usually harvested in two or three pickings--the first from the sunny side of the tree and later from the shady side and the inside.

The Sundays River cooperative operates three large packinghouses with a total capacity of 20,000 packed boxes per day. These plants generate their own electric power. They are economical and allow some flexibility in operations because, by collecting fruit from many growers, variations from scheduled receipts are more easily handled. Packinghouses are installing washing machines, because the use of new pesticides has made fruit washing necessary.

Fruit can be shipped to Port Elizabeth from the Sundays River district in one day. Sundays River is able to make up the deficit when Transvaal shipments are short.

Lemons are packed in the new 1/2-box wooden crate, which is the size of a full box divided horizontally. This lemon crate is well received in European markets.

Nurseries. --There are excellent nurseries in the area. In 1956, 1-year-old trees were selling for 63 to 70 cents per tree.

All plantings are made bare root. Rough lemon stock is used extensively. Some sweet orange stock is produced, but it does not grow as rapidly as rough lemon and is more difficult to establish in the grove.

One progressive nurseryman prunes newly planted seedlings to within 1 inch of the ground, thereby compensating for any damage to the seedling roots in the planting process. Seedling trees grown by this practice have long straight stems and are excellent examples of nursery stock.

Patentie

A growing citrus area with a season similar to the Sundays River area is on the Gamtoos River. This valley is more extensive than the Sundays River.

Climate.--The climatic hazards are wind and flood. A dam, planned for the Couga River, may help to eliminate the flood hazard.

Cultural Conditions and Practices.--The soils are red and somewhat heavier than those of the Sundays River Valley. Citrus is being expanded rapidly and the acreage of new plantings exceeds that of bearing age. Large areas of virgin land suitable for irrigation are available. There is abundant water for the present irrigated area and the problem of water salinity is not critical. The dam on the Couga River will increase the valley's water supply.

Production.--The yield of both Valencia and naval oranges in this area is excellent. Navel oranges are of good quality, but there is a problem of small-size fruits produced in some Valencia groves. It is thought this size problem is caused by planting groves on land formerly used to grow tobacco.

This valley seems to have an excellent potential citrus future and may develop an industry equal to that of the Sundays River, and thus become a major South African citrus source.

Costs

Wages in the Eastern Cape Coastal Region are somewhat higher than in other parts of South Africa. The average rate of pay for packing ranges from 3 to 5 cents per box. European women packers average about $4.00 per week, out of which they must pay room and board. Mixed race packers average 35 to 40 boxes per day and Europeans, 60 to 65 boxes per day. Europeans have packed as high as 100 boxes per day of navel oranges and grapefruit.

In 1955, packing material, (including box, fruit wrappers, strapping material, etc.) cost about 75 cents per box; and the cost of packing, (including wages, interest, and depreciation) was estimated at 39 cents per box, bring total packing costs to $1.14 per box.

The packinghouse does some spraying and fumigating in the groves. In 1955, the cost of applying spray materials averaged about 11 cents per tree, and the average cost of fumigating was 17 cents per tree.

In table 6 the actual cash costs of operating a citrus grove in the Sundays River area are given. This is representative of costs in some of the best tended groves where high yields would be obtained. The average planting density is 83 trees per acre and the average yield is four boxes per tree (322 boxes per acre), bringing the total cost of production to 53 cents per box.

WESTERN CAPE PROVINCE[6]

This is the western part of the Cape of Good Hope Province and contained 9 percent of total South African citrus acreage in 1955. Citrus has been grown here for the last 300 years, but is of minor importance to today's industry.

The most important area is on the Olifants River at Citrusdal and Clanwilliam. Other commerical plantings are at Piquetberg, Swellendam, Heidelberg, Calitzdorp, Paarl, and Mossel Bay.

Citrusdal

Citrusdal is located 100 miles from Capetown. The country has little vegetation except in the river valleys. In the winter months (June, July, and August) there is snow on the surrounding mountain ranges.

Season and Climate. --This is one of the late citrus areas. Trees normally bloom from Sept. 15 to Oct. 15. Navel oranges from this bloom ripen about May 1 and Valencias, about Aug. 1.

Floods and drought are hazards. Frost may also damage fruit--usually in July. In June 1956, temperatures were so low that both Valencia and navel oranges showed ice crystals when cut, and lemons were frozen so badly that all the button lemons on the trees were destroyed.

This district has the lowest rainfall of the South African citrus producing areas. At Clanwilliam the average is only 8 inches per year. The pattern of rainfall is different: the months of highest precipitation are in the winter (May-August), exactly opposite the Transvaal where the winters are dry and the summers wet.

Cultural Conditions and Practices. --Soil is very light and sandy, affording excellent root drainage, but requiring careful irrigation and a heavy fertilizer program. Trees grow slowly and are planted 20 feet apart--an average density of about 106 trees per acre.

Good commercial groves use 3 pounds of ammonium nitrate, 2 pounds of super phosphate, 2 pounds of muriated potash, and 2 pounds of magnesium sulfate to fertilize each tree. Copper sulfate is also added to the soil to correct peel difficulties caused by a copper deficiency.

The heavy fertilization program and other current cultural methods were started as a result of Peter Crouse's study of the U.S. citrus industry. Mr. Crouse reported that the soil conditions at Citrusdal were similar to those of Florida. A fertilization program similar to Florida's was instituted and found to be effective.

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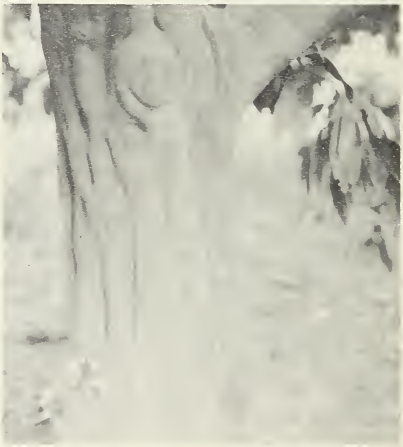
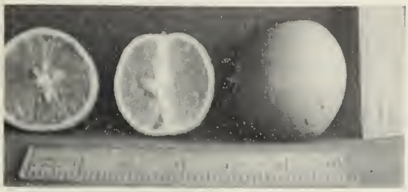
[6] Also known as Western Province and Western Cape.

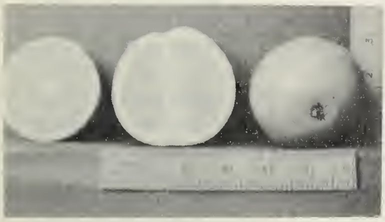
Native citrus workers live in villages adjoining groves in the Transvaal. Housing and food are almost always included as part of wages.

A grapefruit tree showing decline. Decline disease affects old trees.



"Stem pitting" disease causes concave deformities in the bark of grapefruit trees. The virus destroys mature groves, decreasing production.

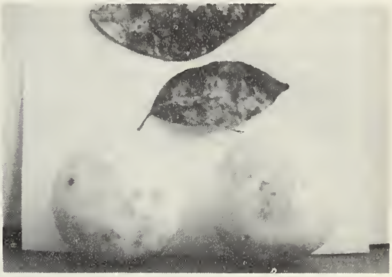




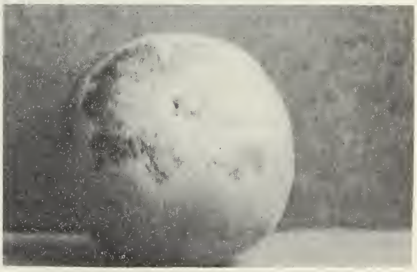
The Triumph grapefruit is seedless. About 90 percent of South Africa' s grapefruit exports go to England.

The new 1/2-box lemon crate used by Sundays River packers is very well received in European markets.

In the future midseason oranges will close the gap between the navel and Valencia season. Top left, the Tomango is a seedless midseason variety. Left, the Premier, a local shamouti variety of Southern Rhodesia is used for processing.



Concentric ring blotch is caused by a gray mite which concentrates 800 to 900 to a square inch on both oranges and leaves.



"Stem end browning" causes the peel at the stem end of citrus to dry and turn brown. It develops in transit and causes serious economic loss.

Land is tilled mechanically. A cover crop of legumes or grass is commonly raised in winter months and the area is clean cultivated in summer.

Irrigation water is of good quality, but the sandy soil creates a problem of application. Water is usually run down the rows in aluminum pipes and the basins are filled from these. Some growers are installing low-head sprinklers. The Olifants River is often dry in summer when irrigation water is needed.

Pests.--The major infestation is California red scale. Minor pests are aphis, thrip, cotton bollworm, Mediterranean fruitfly, false codling moth, some leaf hoppers, and mealy bug. Sooty mould caused by mealy bug results in heavy culling of fruit in some seasons.

The scale pests are controlled by fumigation, oil sprays, and parathion. Control measures are usually practiced between December and February. Generally one application of a spray including a pesticide and minor elements (magnesium and zinc) is used per year.

Production.--Citrusdal produces 350,000 boxes of fruit annually--the oranges are about 50 percent Valencia and 50 percent navel oranges; and a few thousand boxes of Eureka lemons. Fruit may be tree-stored in good condition for a long time, an advantage in times of marketing difficulty. Navel oranges may be harvested from May to August and Valencias, from August to February of the following year.

Lemons are harvested in two periods. The largest picking is between May 15 and Aug. 1 and the second is usually made from October to January. The latter period is outside the export season and has proven very profitable, since prices in the domestic market are generally favorable at this time of year.

Lemons are sometimes picked and stored in the grove in boxes for 4 or 5 days before going to the packinghouses. This curing period is supposed to produce better quality fruit, but it exposes fruit to frost damage.

Costs

Wage rates in Citrusdal are high for South Africa. These high wages bring some immigrants to the area from the Transvaal. A man working in the packinghouse receives a wage of $1.05 per day and a tractor operator is paid 73 cents per day, plus housing. European women packers are paid on a piecework basis. In 1956, the rate was 1 to 2 cents per 100 fruits for the first 32,000 packed, 3 cents per 100 from 32,000 to 40,000, and 3-1/2 cents per 100 for all in excess of 40,000 per week.

The estimated costs of operating a citrus grove are given in table 7. Irrigation costs depend on the location of the grove. Groves which use tributary streams and gravity water applied by either sprinkler or basin irrigation spend about

$14 per acre per year, whereas groves which have to pump water from the river and elevate it may spend as high as $42 per acre per year for irrigation.

A 15-year-old grove receiving good care averages about three packed boxes per tree and the average density is about 106 trees per acre, therefore the average cash cost ranges from 37 to 45 cents per packed box.

Excellent returns have been received for citrus and the price of the land is high. A planted grove in Citrusdal was estimated to have a sales value of from $560 to $840 per acre in 1956.

All fruit is transported by truck from Citrusdal to the railway at Eendekuil.

SUBSIDIARY PRODUCING AREAS

There are three subsidiary producing areas in adjacent territories that are affiliated with the citrus marketing organization of the Union of South Africa and are an important part of Southern Africa's future citrus development. They are Portuguese Mozambique, British Swaziland, and Southern Rhodesia.

Mozambique

This Portuguese territory is a small citrus-producing area, located on a low coastal plain near the sea. Grapefruit is the primary variety produced.

All the citrus exported from Mozambique is shipped through the port of Lourenco Marques. This port is also used by the South African Citrus Exchange to export Northern and Eastern Transvaal citrus. Portuguese citrus exports by the South African Citrus Exchange in 1955 are shown in table 8.

Swaziland

Swaziland is a native protectorate under British control and is not subject to the laws of the Union of South Africa--including those regulating citrus marketing. This section of the country has extensive lands suitable for citrus production. Three large rivers run through the area, providing abundant water supplies. In 1956, it was estimated that there were at least 100,000 citrus trees, averaging about 6 years of age, in the area. Large nurseries exist, and, according to reports, there are extensive development plans underway.

Europeans may purchase property in Swaziland. Values are low in comparison with land in the United States. Irrigated property suitable for citrus culture is reported to be available at about $75 per acre and citrus gravity water can be obtained for about $50 per acre for the irrigation facilities.

One of the limitations is the lack of transport. Swaziland is not served by a railroad and packed citrus has to be trucked 60 to 100 miles to reach railway transport. In 1956 oranges were exported for the first time.

Trade sources indicate that as production increases, a citrus processing plant is being considered. Swaziland is certain to become a commercial citrus producing area in the future and it is likely that new citrus plantings will continue here longer than in the Union because it costs less to develop a grove.

Southern Rhodesia

Southern Rhodesia is an important subsidiary citrus area to the Union. The Mazoe Estates near Salisbury and their related plantings near Umtali largely represent the commercial production of export-type fruit. Also, there are several small plantings that produce for the domestic market.

Population in Southern Rhodesia is expanding rapidly. From 1946 to 1956, the African population increased from 5.4 million to about 6.7 million people and the European population increased from 108,000 to over 220,000. It is expected to continue to increase in the near future. As population expands there will be more opportunities for domestic marketing.

Citrus plantings in 1956 were estimated at approximately 3,000 acres. There were two distinct types of holdings--the small property, selling fruit entirely for local consumption and the large estate properties such as Mazoe, providing fruit primarily for export as citrus juice. The Mazoe Estate has about 1,600 acres of bearing and nonbearing trees. Acreage is being extended. Mazoe will probably plant an additional 200 acres by 1957 and continue expanding plantings until production is sufficient to utilize its processing plant to capacity. The balance of the citrus acreage is scattered--mainly near Salisbury, Umtali, and Fort Victoria.

If present plantings continue, it is possible that by 1964, the total citrus acreage in Rhodesia could reach 5,000 acres.

Season and Climate.--Orange trees bloom between Aug. 20 and Sept. 15 and produce fruit which may be harvested from Apr. 1. The harvest season of the Washington navel orange is from the first of April to the middle of June; the Premier, from May 15 to July 1; and the Valencia, from July to November.

Rainfall occurs during the summer (December-April) when an average of 36 inches is normal, but as much as 62 inches has been known to fall. Rainfall up to 9 inches in 24 hours is not uncommon during this season. In the fall and winter (April-August) there is relatively low humidity and little rainfall. During the dry season (May-November) temperature variation between day and night may range from 85° F. to as low as 40° F. In some areas frost occasionally damages trees and fruit.

Cultural Conditions and Practices.--Citrus is grown mainly under a turf culture to prevent erosion during the rainy season. The grass is cut by power equipment where possible and by hand around the base of the trees or on rough ground. Trees must be irrigated for at least 6 months of the year. All trees are grafted on rough lemon root stock.

Varieties.--The primary export type of orange produced at Mazoe is the Valencia. Other major varieties are the Washington navel orange and a local Shamouti type called the Premier. The Washington navel orange is used only as fresh fruit in the local market and the Premier and the Valencia are usually processed. The Premier is being grown to extend the citrus processing season. Many minor varieties are produced in groves raising fruit for local consumption--including some seedless oranges. Small quantities of lemons and tangerines are produced, but little grapefruit is grown in Southern Rhodesia.

Pests.--The most common pests are California red scale, thrips, soft brown scale, coffee scale, false codling moth, and the Mediterranean fruitfly. Scales are controlled by parathion used alone or combined with oil sprays. Scale control sprays are usually applied between August and March.

The false codling moth causes the greatest loss. It is a gray moth which deposits its eggs on the fruit. The egg hatches into a fruit-destroying grub that is difficult to control. At Mazoe it is controlled by careful grove sanitation during the fall when fruit is ripening. Infested fruit, which colors prematurely, is picked and placed in vats of water covered with a layer of oil to kill the grub.

Production.--Southern Rhodesia produces excellent quality citrus. The extraction of 10 pounds of oil from a ton of oranges is not unusual. Well cultivated orange trees have good production records and yields of five boxes and more per tree are normal.

In 1955 the total orange production was estimated at about 500,000 boxes. Half of these were produced at Mazoe and 35,000 boxes were grown at Umtali on another property belonging to the Mazoe organization. Nearly 60 percent of the 1955 production was export type fruit. Citrus production, primarily oranges, is expected to reach about 800,000 boxes by 1964.

A new railroad linking Southern Rhodesia with the Portuguese port of Lourenco Marques may play an important part in future expansion. New plantings are planned near Fort Victoria on inexpensive land near the new rail line.

A company has been formed to exploit about 40,000 acres of land in the "Hippo Valley." The project will include constructing two dams. Land clearance was started in 1956 and plans were made to plant 100,000 budded citrus trees and 1 million seedlings by the end of the year. Fresh fruit packinghouses and a processing plant are planned for the future.

Citrus production areas are limited by lack of rail transport to domestic markets and shipping points. Areas of population, which might be citrus consumers, are difficult to reach with present transportation facilities. Supplemental shipping facilities may be available in the future, but even if additional sea transportation is made available, the rail transport problem would still remain unsolved. And there is also the question of the ability of Lourenco Marques to handle the additional fruit tonnage.

Processing.--The entire export citrus crop of the Mazoe Estate is processed. A modern processing plant is located at the Estate and the fruit is handled in bulk from the grove to the plant--where trailers of bulk fruit are automatically dumped into a receiving hopper and carried by conveyors to storage bins. Water conveyors carry the fruit from storage bins to processing--transporting and washing the fruit in the same operation. Next oil is extracted by machine. Juice is also extracted mechanically, except for extra large lemons and grapefruit, which are juiced on hand reamers.

The primary products are concentrated juices which are sold to bottlers in the British squash trade. In 1955, the Mazoe Estate manufactured about 83,000 U. S. gallons of 61° Brix concentrated orange juice, approximately 14,000 gallons of 72° Brix concentrated orange juice, and about 6,000 gallons of 3-3/4 times concentrated lemon juice. In addition, 70,000 pounds of raw cold pressed orange oil and 2,000 pounds of cold pressed lemon oil were manufactured.

Small quantities of grapefruit are imported from Mozambique to make grapefruit juice concentrate for sale to local bottlers. The plant has installed a modern continuous concentrator with a capacity of 500 gallons of single strength juice per hour.

Facilities are available to produce pasteurized, canned, single strength juice. Large-scale production is not planned, but in 1956, a small quantity was packed as an experiment.

The processing plant dehydrates all waste materials of peels and pulp for cattle feed, for which there is a ready market in Southern Rhodesia. The waste material is carried from the juice extractors to the dehydrator by means of a water conveyor to which lime has been added. Adding lime to the water neutralizes acids, prevents damage to the floor and equipment, and reduces the quantity of lime needed for the dehydration process.

Until recently all concentrate for export was packed in 25 to 26 imperial gallon barrels imported from the United States and Canada. The concentrate was preserved with SO_2 (sulfur dioxide). In 1956 new-type canning equipment was being installed for packing concentrates. The new canning process will eliminate the use of sulfur dioxide. Canning pasteurized concentrates without preservatives will improve the quality of the product, but will increase costs.

Marketing.--In the immediate future exports of citrus from Southern Rhodesia will be in the form of orange juice concentrate for sale in the English market. Demand is good and no marketing difficulties are foreseen. The freight rate for concentrated juice averages about 7 cents per gallon from the plant to the port of shipment and 21 cents per gallon from the port to the United Kingdom--including the cost of landing and insurance.

Association is maintained with the South African Co-operative Citrus Exchange, even though no fresh fruit is being exported from Southern Rhodesia. One of the directors of the Exchange is a representative and a resident of Southern Rhodesia.

An effort is made to keep the domestic market sufficiently supplied with fruit to hold prices at a reasonable level. As the population expands opportunities for domestic marketing will increase.

Costs

The major labor force of Mazoe Estate both in the field and the processing plant is native African. Workers are housed on the Estate and paid an average of $7.00 per month for unskilled work and up to three times that much for skilled labor. They also receive their basic food at a cost to the organization of about $4.90 per month. The company provides schooling, medical attention, and blankets. All, excepting field workers, are issued uniforms. There are company-operated stores where workers can purchase their main requirements at cost. In general the Mazoe Estates follow a progressive policy affording good conditions and probably paying a better than average wage. In 1956 the total labor force was 1,150 workers.

CITRUS AND SUBTROPICAL HORTICULTURAL STATION, NELSPRUIT

The Citrus Experiment Station for the Union of South Africa is at Nelspruit, and, considering the size of the citrus industry, has excellent buildings and equipment and is staffed with competent people. The extensiveness of the experimental work carried on may be seen by the following list of projects in progress.

1. Shipping and transport problems are studied by shipping packed fruit, refrigerated to simulate transport to export markets, to Lourenco Marques and back. Fruit is examined for juice content, solids, etc.
2. Investigations to control "black spot" disease in the grove and in packed fruit are underway.
3. Extensive field experiments are being carried on. They include:
    - a. Root stock experiments with strains of rough lemon and sweet orange to observe the differences between these strains.
    - b. Trying different roots, such as the Empress Mandarin.
    - c. Testing strains of producing varieties upon uniform root stocks. Wide variations have been found in Valencia and naval oranges.
    - d. Experiments in midseason varieties on rough lemon and sweet orange stock.
    - e. Experiments to illustrate the effect of time of harvest on citrus production. Measuring the yield of Valencia oranges by the time of harvest; a part of the grove is picked before the blossom and a part after the blossom. Measuring the effect of out-of-season fruit; a part of the fruit is picked while a part is allowed to remain on the trees to be harvested normally.
    - f. Experiments on methods of production from permanent grass coverage to clean nontillage to determine the effect of cultural practices on production. In this grove the permanent grass coverage makes a poor showing compared with other tillage methods.
    - g. Fertilization experiments showing the effect of cover crops and varying amounts of fertilizing materials.
    - h. Finding the effect that replanting old groves has on production. Old trees are removed from the grove and replaced. The growth of the replants is measured against the same age trees planted in adjacent areas.
    - i. Measuring the effect of arsenic sprays on citrus maturity and quality.
    - j. A long term irrigation project to measure the yield of fruit by the various means of supplying water and the quantity of water applied.
    - k. Maintaining a variety collection which is probably one of the most extensive in the world including fruit and root stock types.

The scope of the experiments outlined here shows that some very important experimental work is being undertaken at Nelspruit. The variety, root stock, and commercial field trials are unique in the world for extensiveness of the experiments and the excellent comparative work which may result.

Citrus experimental work in South Africa is complicated by the widely scattered industry and the many conditions under which trees are raised. The experiment station is located in the "Florida" of South Africa and the cultural and disease problems are different than those in other areas.

GOVERNMENT ASSISTANCE TO THE CITRUS INDUSTRY

Government assistance to the citrus industry is available in several forms.

Taxation. --Citrus growers are required to pay income taxes but with special concessions. Taxes on citrus land are nominal. The absence of the fixed obligation of land taxes is a distinct advantage to the South African citrus industry. It reduces production costs and increases the ability of growers to survive periods of low citrus prices.

Irrigation. --The government assists farmers and citrus growers with loans for irrigation projects and with subsidies to farmers and farmer organizations on approved irrigation projects. Among the items which may be subsidized is the drilling of wells for irrigation purposes and the building of on-farm catchment basins. Irrigation canals and distribution systems may also at times be eligible for subsidy. This represents substantial assistance to growers and is particularly important since it affects the development of new citrus areas.

Domestic Freight Rates. --The rail freight rates within the Union of South Africa are controlled by the government, which owns and controls all air and rail transportation.

Table 9 shows the great difference in the freight rate for export and domestic fruit. In shipments to Port Elizabeth, for example, export fruit from the Northern Transvaal area of Politsi costs $6.54 per ton to ship, while fruit for domestic consumption costs $12.54 per ton. Trade sources explain that the difference is because cars loaded with export fruit packed in boxes carry full loads to port, while cars loaded with fruit packed in mesh bags for local consumption cannot be loaded as heavily. The major interior markets are Johannesburg and Pretoria, but the coastal ports are also some of the largest consuming areas in the Union and, therefore, considerable quantities of domestic fruit move over much the same rail distance as export fruit.

There are several processing factories in the Port Elizabeth area; they must also pay the domestic freight rate.

The favorable interior freight rates for export fruit illustrate a government assistance to citrus exports and a disadvantage to growers for the domestic market and to processors.

Sea Freight Rates. --Citrus shipped from South Africa to European ports is handled primarily by the Union Castle

TABLE 14.--Oranges: Estimated average cost of production in the Union of South Africa and marketing in the United Kingdom per export box, 1956

Item	Costs
	U.S. dollars
Cash production costs	0.56 - 0.70
Picking, local transportation, and packing	.42
Packing material[1]	.84
Railage to port (average)[1]	.16
Port charges (including precooling, agent's shipping charges, all handling)	.17
Total cost, f.o.b. South Africa	2.15 - 2.29
Sea freight to Europe (1956 contract rate)	1.03
Selling expenses:	
Taxes	.05
Advertising	.05
Other expenses in U.K. markets	.50
Total break-even costs	3.78 - 3.92

[1] Depending on location and rail costs from ports.

TABLE 15.--Citrus: Some unit costs in the Union of South Africa, 1956

Item	Unit	Cost
		U.S. dollars
Picking and packing:		
Packing material	Box	0.75 - 0.86
Packing costs	do	.18 - .39
Picking, packing, local transportation	do	.42
Packinghouse labor:		
Women, Transvaal	Month	11.80 - 14.00
Men, Transvaal	Day	[1] .24 - .42
Field labor:		
Cape	do	[1] .63 - .70
Natal	Month	[1] 2.80
Transvaal	Day	[1] .28 - .35
Cultural costs:		
Spraying:		
Eastern Cape	Tree	.12
Eastern Cape	100 gallons	2.24
Grahamstown	Tree	.14 - .21
Irrigation water (Cape)	Acre	3.00 - 12.00
Cultural costs (total)	Tree	.42
Tractor cultivation	do	.18
Sulfate of ammonia	Ton	56.00
Land values:		
Irrigated land:		
Nelspruit	Acre	420.00
Sundays River	do	1,400.00
Bearing grove, Nelspruit	do	2,380.00

[1] Plus housing, food allowance, and other services.

TABLE 16.--Union of South Africa: Population, by race, 1955[1]

Race	Number
	Thousands
White	2,856
Asiatic	410
Mixed race	1,242
Native	9,121
Total	13,629

[1] Census estimate.

TABLE 17.--Sweet oranges, lemons, and grapefruit: Utilization by the Citrus Marketing Board, 1947-55

Year	Sweet oranges			Lemons			Grapefruit		
	Exports	Domestic consumption[1]	Processed	Exports	Domestic consumption[2]	Processed	Exports	Domestic consumption[2]	Processed
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1947	3,029	2,255	188	7	73	37	276	54	205
1948	3,077	2,405	268	17	88	31	335	27	211
1949	3,401	2,568	198	44	83	22	335	32	50
1950	4,202	2,218	310	54	43	31	347	47	122
1951	4,032	2,097	342	59	44	49	374	39	118
1952	3,386	2,107	350	65	27	29	240	18	85
1953	4,785	1,955	428	65	22	33	290	27	140
1954	5,316	2,787	523	65	21	33	282	35	87
1955	5,693	2,334	489	83	30	32	288	25	81

[1] Includes export-season fruit under the control of the Exchange, sales by nonexporters, and out-of-season sales by exporters.
[2] Includes only export-season fruit under the control of the Exchange.

Exports from official Union of South Africa data. Domestic consumption and use for products from the South African Co-operative Citrus Exchange, Ltd.

TABLE 18.--Oranges and tangerines: Per capita consumption in citrus producing and importing countries, 1953

Country	Per capita consumption	Country	Per capita consumption
Producing countries:[1]	*Pounds*	Importing countries:[2]	*Pounds*
Mexico	43.40	Belgium	28.70
Argentina	54.60	Denmark	15.40
Brazil	38.50	France	28.70
Italy	23.80	Germany	18.90
Spain	30.80	Netherlands	21.70
Algeria	37.80	Norway	35.70
Egypt	29.40	Sweden	27.30
French Morocco	9.10	Switzerland	25.90
Tunisia	[3] 24.50	United Kingdom	18.90
South Africa	15.94		
United States	[4] 62.60		

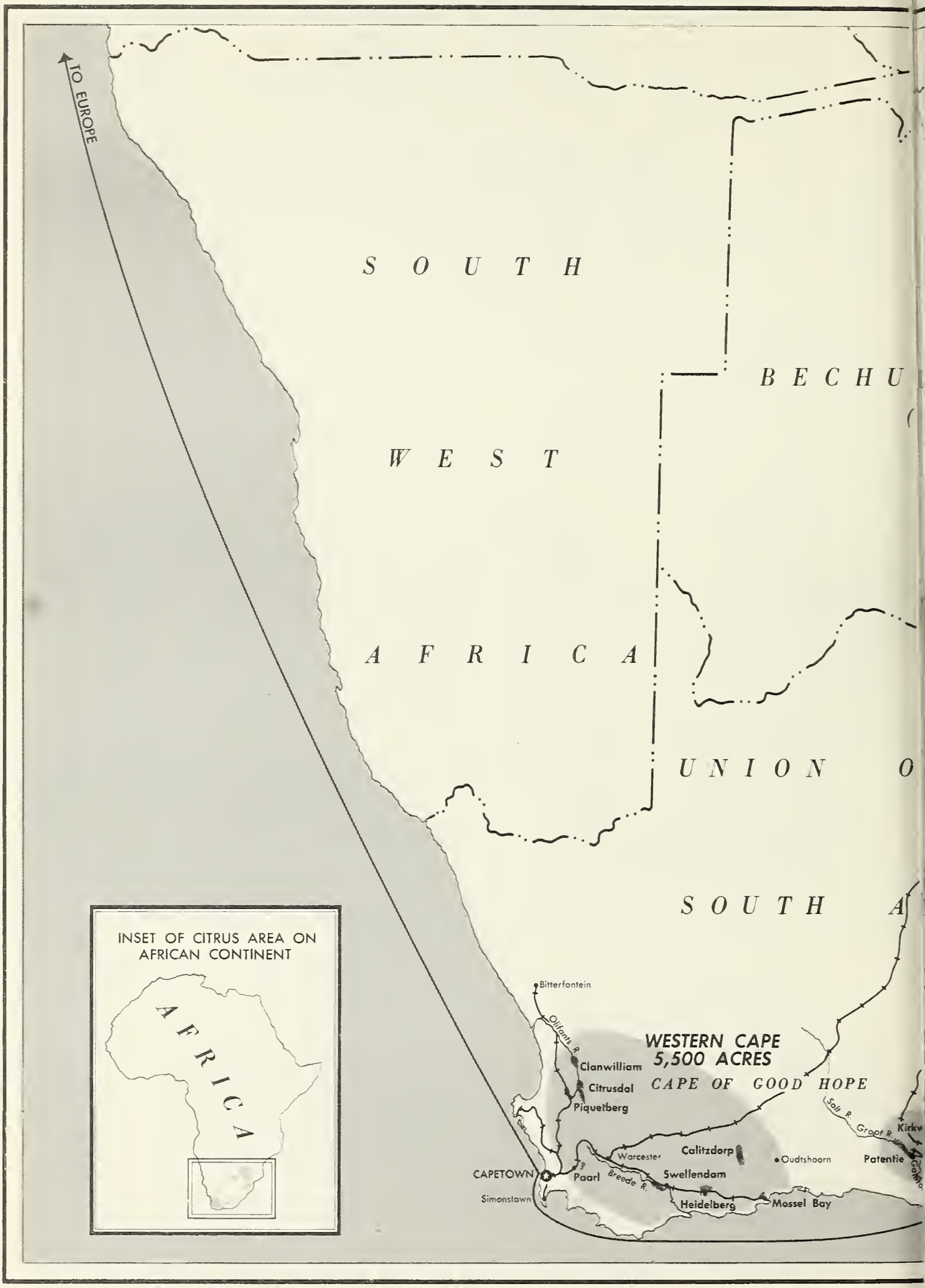
[1] Includes use for products in all cases and the data are inflated to the extent of the export of products.
[2] Includes only fresh fruit consumption.
[3] Includes domestic use fresh and for products during export season and estimated out-of-season sales of exporters, plus estimated sales by nonexporters.
[4] Includes 29.4 pounds fresh, 24.2 pounds frozen, 9 pounds canned.

TABLE 19.--Citrus: Total quantity exported from the five major export ports, 1953-55 and quantity of export fruit rejected at each port, 1955

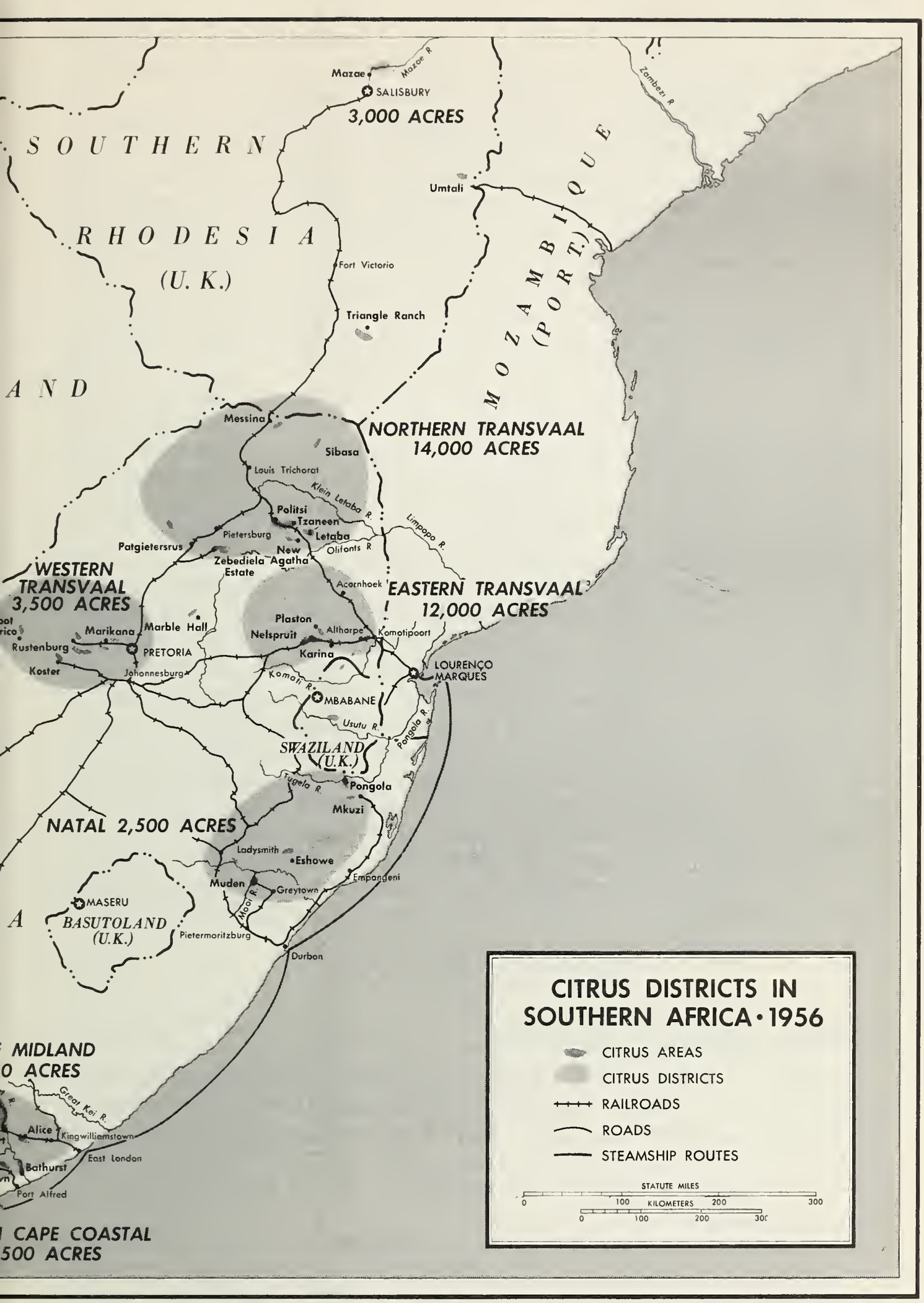
Export port	Citrus shipped			Exports rejected 1955
	1953	1954	1955	
	Boxes	*Boxes*	*Boxes*	*Boxes*
Capetown	1,910,667	2,505,980	2,649,403	84,068
Port Elizabeth	1,462,591	1,794,041	1,953,043	[1] 21,515
East London	610,610	750,831	681,196	[1] 7,239
Durban	736,503	822,253	679,627	[1] 41,597
Lourenco Marques	605,735	669,676	471,635	---
Total	5,326,106	6,542,781	6,434,904	154,419

[1] Includes some fruit loaded at the Port of Lourenco Marques.

Report of Co-operative Shippers Service, Ltd.



U. S. DEPARTMENT OF AGRICULTURE



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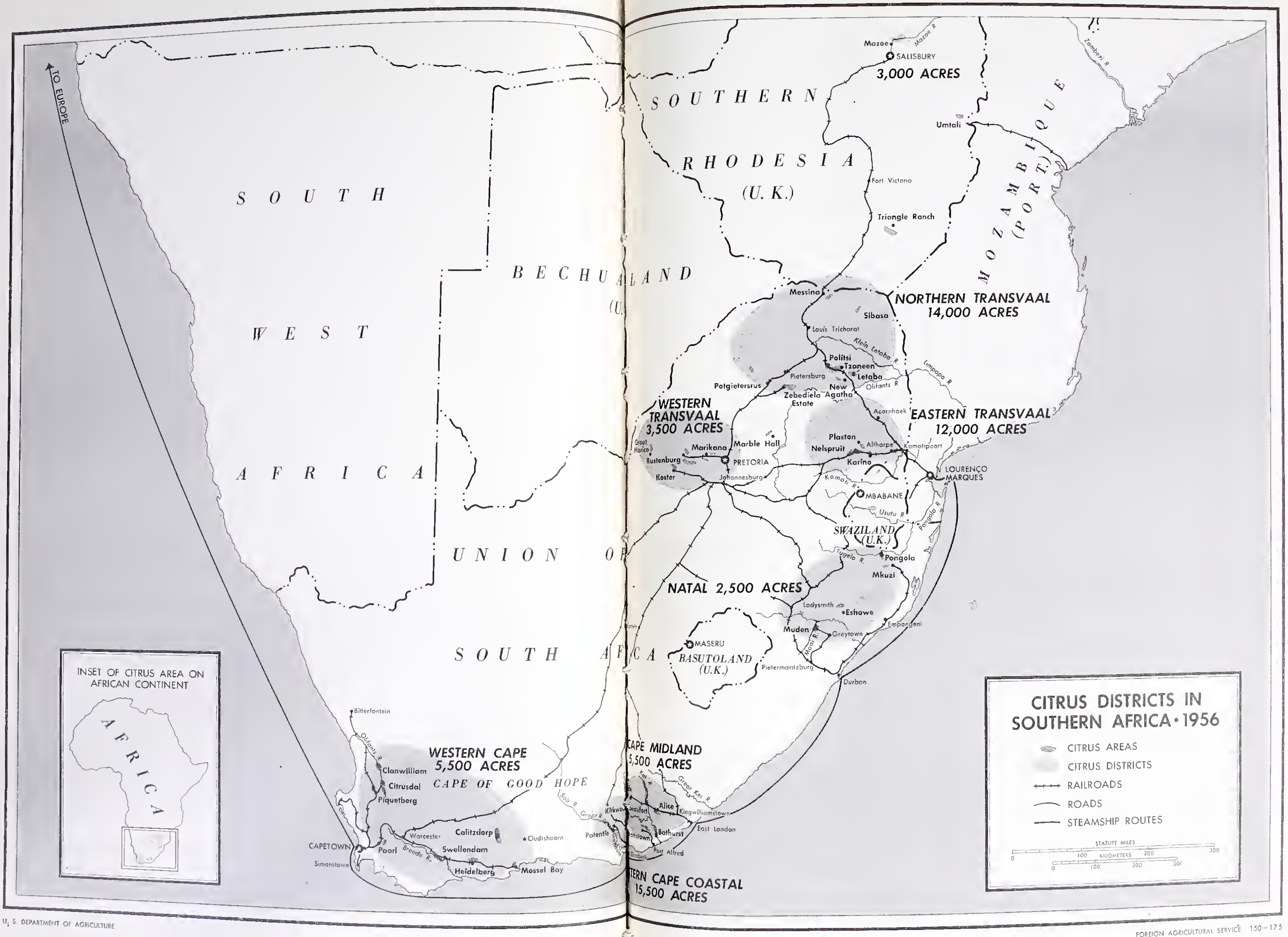
FOREIGN AGRICULTURAL SERVICE 150–175



CITRUS DISTRICTS IN SOUTHERN AFRICA · 1956

Steamship Line, which incidentally, holds a mail contract with the Government of South Africa under which the mail is carried on a weekly schedule to England. The freight rates must be ratified by the Union of South Africa.

In 1956 the contract rate for shipping citrus from South Africa to European ports was $1.03 per export box. The contract provides for handling approximately 6 million cases of citrus per year at this price. In the 1956 season, this space was inadequate to accommodate all of the exports and it was necessary to charter additional space in the open market, at a cost of $1.75 per box. Trade sources indicate that two new vessels are being built to add to the refrigerated freight capacity and that the rate of these new vessels will be above the contract rate, or about $1.47 per box. The difference in freight costs is distributed by pooling.

The contract freight rates for citrus are the lowest in the world. The refrigerated freight available in South Africa is very desirable from a shipping standpoint because, in the noncitrus season, deciduous fruit is available for export, making it possible to have full cargoes of refrigerated freight for about 10 months of the year.

Trade sources indicate that in the future higher freight rates will be necessary to maintain this service, and it is likely that the contract freight rate will be adjusted upward within the next 3 years. When it is necessary to replace the ships now in use, the increased cost of construction will bring about a reconsideration of the whole freight structure on the shipment of fruit from South Africa. In 1956, the Union Castle Line became affiliated with the Clan Line. The new management may consider an adjustment of freight rates so that traffic may be more remunerative.

To the extent that freight rates will be increased in the future, South Africa will be less competitive in the European citrus markets.

RETURNS AND COSTS

Average Returns to Growers

Table 10 shows the excellent returns South African citrus growers have been receiving. Although prices have declined slowly since 1952, growers still received attractive returns in 1955--$3.60 per box for oranges, $3.72 for lemons, and $4.36 for grapefruit. These high returns have stimulated new plantings.

By expanding citrus plantings, many growers have spent their earnings and have obligated themselves to the expense of caring for new groves until they come into bearing.

Oranges

Grade.--Export oranges are packed in three grades--fancy, under "Outspan" brand, choice, and standard (table 10). Only the "Outspan" brand is advertised. Advertising has had little effect in improving grower returns on fruit sold under this brand. In the opinion of the European import trade, there must be a small difference in quality between South African fruit grades.

Pool.--Table 11 compares returns in the several time pools in which the fruit was marketed. A marked difference is shown between Valencia and navel oranges. The highest returns were from the first pool in each case. For navel oranges, however, the payments in the last pool were higher than in the second pool.

Returns on Valencia oranges were lower in the second pool than in the first or third, owing in part perhaps to competition from California oranges. Payments in the fourth pool were the lowest of all because of competition with Mediterranean oranges. Valencia growers in an early district or having early fruit received the best returns. From these data there would seem to be little incentive to hold Valencia oranges for late export.

Size.--The returns to growers at the packinghouse for navel oranges varied greatly by size in 1955. In a pool, size 126 fruit returned $3.20 per box; size 216, $4.89; and size 288, $5.30 per box. This illustrates the handicap South Africa faces in marketing large-size navel oranges. It also illustrates that South African navel oranges are supplemented by small California Valencias.

There was a smaller difference in returns by size for Valencia oranges in 1955. In a pool, size 126 fruit returned $3.78 per box compared with $3.01 for size 252 and $2.61 for size 344. Higher returns were obtained for larger Valencias--the reverse of those for navel oranges.

Lemons

Grade.--Export lemons are packed in two grades--choice and standard. Comparing returns by grade in size 270 in 1955 (table 12) the difference between choice and standard varied from 45 to 14 U. S. cents per box. This is a greater difference than for grapefruit and oranges, but it is still remarkably small.

Pool.--Returns from various pools differ more for lemons than for oranges. In choice grade the first pool returned $1.01 per box more than the second pool and 78 cents more per box than the third pool.

Size.--Medium-size lemons brought the highest returns, but smaller fruit generally returned more than large fruit. In a pool, size 100 returned $2.05 per box; size 140, $3.27; size 180, $3.55; size 270, $3.85; and size 378, $3.18 per box. This would seem to indicate that increased volume of exports will quickly make large sizes unprofitable.

Grapefruit

Grade.--Grapefruit, like oranges, are exported in three grades--"Outspan," choice, and standard (table 11). Like oranges, too, differences in returns between grades are small and no increase in returns is evident from the advertising of "Outspan" brand.

Pool.--The first pool brought much the highest return illustrating the advantage the Eastern Transvaal has over the Eastern Cape Coastal district.

As between sizes, there was little difference in returns in 1955.

Cost of Production

The cash costs of operating groves provide a measure of an area's ability to compete in the world of citrus.

A study of such costs in the Union of South Africa was made for 1948-50 by Dr. N. A. B. Bestbier, using data from over 500 groves. The results of this study are summarized in table 13. (In the cost items, no interest has been included; reasons for the omission were previously stated.)

In that period, the costs of operation ranged from a low of 84 cents per tree in the Kat River district to a high of $1.76 in the Western Transvaal at Rustenburg. In the three districts that produce over two-thirds of South Africa's citrus --the Northern and Eastern Transvaal and Sundays River--costs varied from $1.21 per tree at Sundays River to $1.55 at Tzaneen.

To obtain per acre costs, the density of tree planting in each area was used. This shows a range from $78.96 in the Kat River district to $144.32 in Rustenburg.

Important factors in production costs are yield and average cost per box which are also summarized in table 13.

Assuming that, since the study was made, costs for oranges have increased about 40 percent, average cost in 1956 would be 63 cents per box in the area that grew at least 70 percent of total production that year--Northern and Eastern Transvaal and the Sundays River District. More specifically, data obtained in the field in 1956 show average costs at Sundays River at 53 cents and in the Transvaal at 63 cents. Some fruit is produced at much lower costs--some as low as 35 cents per box.

Considering all factors, a conservative estimate of average cash costs of producing oranges in South Africa in 1956 is 56-70 cents per box. The Citrus Exchange calculates the 1956 costs of production at 98 cents, but that figure includes interest and other factors not applicable here. Using the Citrus Exchange's costs in 1956 of picking, packing, transportation, and precooling, total cost, f.o.b. South Africa, may be estimated at $2.15 to $2.29 per export box (table 14). Adding the freight to Europe, taxes, and selling expenses in Europe, break-even costs in England may be estimated at

$3.78 to $3.92 per box, which means that oranges must sell in England at more than 28 shillings a box to return a profit to most growers.

The 50-cent-per-box expense in English markets includes transportation to sales representatives. This is probably a fair representation of marketing costs in England. Since little local transportation may be involved in sales on the Continent of Europe, costs there will probably average lower.

In these cost figures the item of picking, packing, and local transportation--42 cents per box--is mainly packing-house charges and transport (table 15). The actual labor cost of picking or packing does not average over 10 cents. Packing material--the box, paper wraps, and straps--costs more than producing the fruit does.

Outlook on Costs

The outlook is for slowly increasing costs in South Africa. It is certain that labor costs will not be lower in the future. Ocean freight rates also are increasing. This will affect the costs not only of exporting fruit but also of fertilizers, machinery, and box shook. There is no reason to expect that either cultural or packing costs in 1961 will be below those of 1956.

When surplus supplies of oranges for export become available, increased freight rates may be in effect. Substantial quantities of export citrus will have to be carried by other than contract ships at that time.

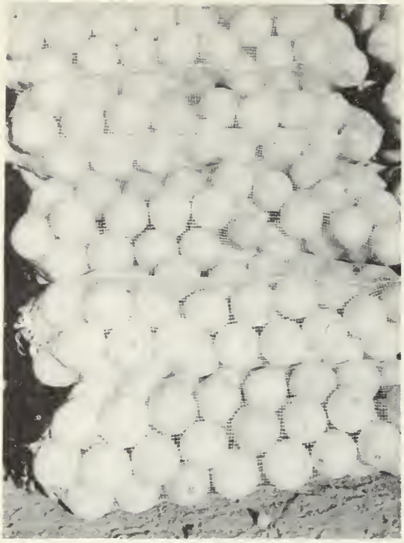
Assuming that the freight rate in 1961 averages $1.47 per box, and assuming all other costs will be the same, then the break-even costs of South Africa will range from $4.22 to $4.36 per box in United Kingdom markets. At this cost, oranges will have to sell at prices of over 31 shillings per box in order to return costs to the average South African grower.

On the Continent, the break-even costs would be lower because of the elimination of transportation dealers. These costs are the ones which will be of critical importance to U. S. citrus exporters for it is on the Continent that most South African market expansion will take place.

Even at the higher freight rates forecast for 1961, South African marketing costs will still be lower than costs anticipated by U. S. citrus exporters.

UTILIZATION OF CITRUS PRODUCTION

Exports are the most important utilization of South African citrus. (Comparable production data is 1 year ahead of utilization since production is the year of the bloom, about September. All utilization takes place the following year.)



Oranges for domestic use are packed in 30-pound mesh bags called "pockets."

Export orange crates are secured with steel straps.

At Durban export citrus is conveyed to precooling rooms on platforms run on rails.

Citrus is loaded from storage building to ship on the same platform which held it in cold storage.

Women workers grade export oranges at a large South African packinghouse.

Fruit is packed in 30-pound mesh bags for processors
and the domestic market.

Citrus peel is cubed and sugar-cured for export to England, where it is mainly
used by the bakery trade.

Oranges

Exports of sweet oranges increased from 3.4 million boxes in 1952 to 5.7 million in 1955. There was no comparable increase in domestic consumption. During this period, domestic sales were under allocation. However, domestic marketing difficulties in June 1956 indicated that, without restriction, domestic utilization would be unlikely to exceed 3 million boxes per year. The use of oranges for products has increased slowly to about 1/2 million boxes a year (table 17).

Domestic consumption of sweet oranges includes two series of data--the domestic sales by exporters during the export season and the estimated out-of-season sales of all citrus by exporters plus the estimated sales of all citrus by nonexporters. For example, in 1955, domestic consumption of fresh oranges included 1.7 million boxes of sweet oranges sold by exporters during the export season plus 632,000 boxes of estimated out-of-season citrus sales by exporters and estimated citrus sales by nonexporters.

Grapefruit

Grapefruit exports have averaged about 300,000 boxes per year since 1947. During this period both domestic consumption and utilization by factories have declined. In 1955, three times as much grapefruit was used by factories as was used fresh in South Africa.

Lemons

Lemon exports on the other hand have increased steadily since 1947, but domestic consumption has declined and the use of lemons by factories has remained fairly constant.

Per Capita Consumption

The Union of South Africa has a rapidly increasing population. It more than doubled between 1911 and 1955. As the population has expanded, its character has remained about the same--about 21 percent being white. In 1955 as estimated 2.9 million were white; 410,000, Asiatic; 1.2 million, of mixed race; and about 9 million were natives (table 16).

This population structure is of great importance to domestic fruit marketing. There is a great difference in income between the white and the nonwhite segments of the population. The nonwhite segment enjoys citrus and would be large consumers if their income would permit.

Table 18 shows that, as a citrus consumer, South Africa makes a poor showing for a producing country.

Seventy-four percent of the South African population has a low income, but this still does not give the reason for the low consumption levels. Certainly Egypt, Tunisia, Algeria, and Mexico do not have high average incomes, yet they consume large quantities of oranges and tangerines.

Consumption Habits

In a month and a half of travel in South Africa during the citrus season, the author had an opportunity to observe South African citrus consuming habits. During this time no hotel served orange juice. Any oranges served in hotels or restaurants were usually served at breakfast. One fruit would be served, cut in half and sectioned to be eaten with a spoon, like grapefruit. Orange juice may be used in some South African homes but that is not the usual means of consuming oranges. In contrast, in Mexico, orange juice is served everywhere--even at street stands.

Increasing citrus production will probably induce the South African industry to try to create a larger domestic citrus market. The native population can consume far larger quantities of citrus. The greatest opportunity for profitable citrus marketing in South Africa is the nearly 3 million white population. The consuming habits observed indicate that it will require a major effort to increase domestic sales.

The consumption of other fruits is increasing, according to trade sources and the South African Department of Agriculture.[7] In 1954, the sales in eight principal markets in South Africa of eight tropical fruits amounted to over $3.5 million. This included sales of pineapples, papayas, mangoes, bananas, avocados, passion fruit, litchis, and guavas. This does not include total sales, because much of this fruit is not sold through markets. By comparison, citrus sold in all domestic markets had a value of $3.5 million.

MARKETING

Domestic Marketing

All domestic marketing of citrus produced by growers having 300 trees or more is controlled by the Citrus Exchange during the export season--Apr. 1 to Nov. 15.[8] All citrus sold in the domestic market is packed in 30-pound mesh bags called "pockets." The South African Government has established maximum prices at which sales can be made to processors, wholesalers, and retailers.

The result of price fixing has affected both the citrus distribution and marketing plans. Domestic citrus is allocated to markets by the Exchange to be received and sold by its agents. In order to facilitate handling it has been customary to allocate fruit according to the demands of each purchaser. The Exchange domestic market may be termed more an allocation agency than a sales organization. In the largest

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[7] This is an accepted fact but no data are available on noncitrus fruit consumption.

[8] The citrus export season changes each year but usually covers the period indicated.

TABLE 20.--Oranges, lemons, and grapefruit: Total exports from the Union of South Africa, 1940-55

Calendar year	Oranges[1]	Lemons	Grapefruit
	Boxes	*Boxes*	*Boxes*
1940[2]	3,604,099	3,750	266,798
1941[2]	1,836,950	176	645
1942[2]	2,527,262	([3])	400
1943[2]	1,401,407	([3])	325
1944	1,094,401	2,031	([3])
1945	2,475,748	60	219,663
1946	2,035,100	11,166	265,298
1947	3,029,337	6,507	276,365
1948	3,076,914	16,693	335,441
1949	3,401,432	44,456	335,264
1950	4,201,661	54,445	346,892
1951	4,032,037	58,532	374,177
1952	3,385,664	65,136	239,988
1953	4,784,945	65,157	290,418
1954	5,316,043	64,977	281,805
1955	5,693,416	82,728	287,946

[1] Oranges and tangerines.
[2] In 65-70 pound boxes--all other years in 70 pound boxes.
[3] None recorded in these war years.

TABLE 21.--Oranges, lemons, and grapefruit: Exports from the Union of South Africa by country of destination, 1954 and 1955

Country of destination	Oranges		Lemons		Grapefruit	
	1954	1955	1954	1955	1954	1955
	Boxes	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*
British Malaya	103,048	---	---	---	653	---
Kenya	9,783	---	---	---	150	---
Mauritius	18,600	---	107	---	47	---
South-West Africa	20,881	---	554	---	36	---
Northern Rhodesia	2,182	---	62	---	18	---
Egypt	3,860	---	447	---	300	---
Belgian Congo	13,272	229	9	---	---	---
French Equatorial Africa	1,276	---	21	---	---	---
French West Africa	5,194	---	51	---	---	---
Portuguese East Africa	14,110	---	31	---	---	---
Sudan	4,274	---	---	---	---	---
Aden	5,194	---	---	---	---	---
Hong Kong	27,249	---	---	---	---	---
New Zealand	61,736	---	---	---	---	---
Canada	1,691	---	---	---	---	---
United Kingdom	3,491,528	3,508,584	45,632	67,010	272,097	272,878
Germany	49,909	498,227	4,153	4,474	896	2,250
Netherlands	319,052	328,251	2,147	3,579	---	1,125
Belgium	10,150	---	---	---	---	---
Switzerland	166,386	---	2,684	---	4,266	5,715
France	499,637	390,633	---	---	---	---
Norway	24,787	---	---	---	---	---
Sweden	272,268	332,818	9,065	5,037	3,313	2,309
Denmark	87,270	---	---	1,191	---	---
Ireland (Eire)	83,988	---	---	---	---	---
Finland	17,800	---	---	---	---	---
Others	954	634,674	14	1,437	29	3,669
Total	5,316,043	5,693,416	64,977	82,728	281,805	287,946

TABLE 22.--Precooling: A comparison of existing and projected facilities at specified South African export ports

Export port	Existing capacity in 1956		Additional capacity planned		Estimated date of completion of new storage
	Cubic tons	*Boxes*	*Cubic tons*	*Boxes*	
Lourenco Marques	1,600	28,356	2,000	35,445	1957
Durban	[1] 1,800	31,901	3,000	53,168	---
East London	2,000	35,445	---	---	---
Port Elizabeth	4,000	70,891	2,000	35,445	1958-59
Capetown	7,500	[2] 132,920	---	---	---
Total	16,900	299,513	7,000	124,058	---

[1] The existing facilities may not be used when the new pre-cooling building is completed leaving the total capacity at Durban of 53,168 boxes.

[2] In addition there is substantial pre-cooling space for deciduous fruit which could be used for citrus and storage for 88.613 boxes of deciduous fruit planned for construction by 1959.

TABLE 23.--Oranges: Total imports into indicated European countries, 1938 and 1955

Country	1938	1955	Country	1938	1955
	1,000 boxes	*1,000 boxes*		*1,000 boxes*	*1,000 boxes*
Belgium	2,417	3,574	Sweden	1,338	2,848
Denmark	316	918	Switzerland	720	1,934
France	5,779	20,429	United Kingdom	16,551	12,096
Germany	2,708	14,520			
Netherlands	2,313	3,680	Total	33,037	61,697
Norway[1]	895	1,698			

[1] Includes all citrus.

TABLE 24.--Oranges: Total imports into indicated European countries in the stipulated winter and summer seasons compared with imports from the Union of South Africa and the United States in 1954

Country	Winter season November 1954-April 1955	Summer season May 1955-October 1955	Total from United States 1954	Total from South Africa 1954
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Belgium	2,314	1,161	864	10
Denmark	724	226	---	87
France[1]	19,376	1,053	108	500
Germany[2]	10,013	3,396	522	50
Netherlands	2,181	1,406	1,594	319
Norway[3]	1,109	400	159	25
Sweden	2,092	769	175	272
Switzerland[2]	1,490	315	157	166
United Kingdom	6,772	4,094	19	3,492
Total	46,071	12,820	3,598	4,921

[1] No monthly import data are available for France. Estimated, assuming summer imports are received from Brazil, California, and South Africa.

[2] Includes tangerines.

[3] Includes all citrus.

domestic market at Johannesburg, 3 days a week, wholesalers are permitted to purchase and 3 days a week retailers may purchase direct. All dealers or buyers must be registered.

In June 1956, large supplies of fruits were being offered and allocations at ceiling prices were no longer possible. The fruit was being auctioned by the Exchange sales agents.

Since the price fixing establishes a ceiling retail price, investigations are made as to compliance. Trade sources indicate that about 40 percent of the fruit is sold above the legally established retail price.

The maximum prices to producers for oranges in 1956 are shown in appendix table 44. South African growers claim that at these maximum prices domestic fruit sales are only break-even business. In June 1956, oranges were being auctioned below the maximum prices bringing even lower returns to growers.

At these controlled prices, the retail cost of oranges has been moderate, averaging less than 1 cent per fruit.

The citrus industry was anxious to be released from domestic marketing controls in 1956. The industries claimed that price ceilings offered no incentive to try to create a larger domestic market. Until 1956, orange supplies were limited and in some years insufficient fruit was available for export. The industry has held the position that because of the limited supplies of oranges, it was inadvisable to stimulate domestic demand.

Export Marketing

All exports of citrus from South Africa are under the control of the Citrus Board, a semi-government organization, which was established in 1939 by the Minister of Agriculture and Forestry under the powers of the Marketing Act of 1937. Under its authority, the Citrus Board controls the export of all citrus and regulates the quantity sold, the conditions of sale, and the methods of packing and grading.

The South African Co-operative Citrus Exchange, Ltd. operating under the powers granted by the Citrus Board markets all exports of citrus. This is a complete marketing organization. It maintains field offices in South Africa to make estimates and assist growers. Fruit is shipped from the packinghouse to ports at Exchange expense. All handling at the port, and ocean freight, is arranged for under the supervision of the Citrus Exchange and paid for by the Exchange to be deducted from returns.

The actual arrangements for shipping space are made by the Perishable Products Control Board which arranges shipping space for both citrus and deciduous exports. All handling at the port is done by the Co-operative Shipping Service, Ltd. which also handles the imports of supplies.

The Citrus Exchange has also been marketing the exports of the three subsidiary areas of Mozambique, Southern Rhodesia, and Swaziland. It has no legal control over marketing from these regions.

European Sales Organization. --The Exchange maintains two sales offices in Europe--the head sales office in London, which handles all fruit distributed in the United Kingdom, and a continental sales office in Rotterdam, which handles all fruit sold on the Continent. These offices are sales agents of the Exchange and are responsible for the distribution of fruit to sellers who are known as sales representatives, and who have a contract with the Exchange. Fruit is the property of the Exchange until it is sold.

The "Panel" Sales Organization. --The panel sales organization covers all of Europe and includes 14 London firms, as well as those in 8 major U. K. markets and in northern and southern Ireland. On the Continent the panel organization includes 4 Belgian firms, 10 in Germany, 5 in the Netherlands, and 1 each in Norway, Sweden, Denmark, Finland, and Switzerland.

These are mostly wholesale fresh fruit dealers in established markets, but they may also be importer-wholesalers and members of an auction. Regardless of the type of dealer each is responsible for obtaining the best returns possible.

Restrictions on Dealer Salesmen. --All panel members in the United Kingdom receive the South African fruit on consignment and in doing so agree to certain restrictions. They may not either buy competitive citrus or handle it on consignment during the South African season (June-November). In former years dealers were not allowed to sell fruit to other countries but this is now permissible. A dealer may sell to other U. K. markets. However, this is seldom done since the Exchange distribution system makes it unprofitable.

The Exchange has attempted to enforce similar restrictions on the continental panel members. In markets such as Denmark and France, where U. S. citrus is excluded or restricted, this has been successful. In free markets, most panel members selling South African oranges also sell competing fruit in the South African season.

Export Marketing Operations. --The marketing process starts when the South African packinghouses each year (January) make out a crop estimate of the weekly pack of export fruit by variety. On the basis of this information, the Citrus Board advises the Perishable Products Export Control Board of the weekly quantity of fruit which will be available for export and the latter Board then engages shipping. About 60 percent of the fruit is shipped via the Union Castle Line. Some of the steamers are on regular scheduled runs to Southampton or London, in which case the port of discharge cannot be changed. The Line also has eight refrigerated ships which carry 130,000 boxes each. These are not on scheduled runs and may discharge cargo at ports selected in transit according to market conditions. In addition to these contract shipping facilities, other ships are chartered on a time basis and may be diverted in transit to suit the marketing needs of the Exchange.

In the spring, the London office receives information regarding the amount to be shipped each week and the ship on which it will be loaded. The office then makes up a plan of scheduled arrivals.

In the United Kingdom the fruit is directed to the three major markets of London, Liverpool, and Glasgow. It is allocated to each dealer in each market according to the volume past experience indicates he can handle.

Unloading and Other Charges.--The Exchange distributes large quantities of fruit from the two home ports of the Union Castle Line--London and Southampton--where, by an old agreement, the Line pays the unloading costs. If the Union Castle Line unloads at other U. K. ports the Exchange has to pay the unloading costs. Because of this arrangement, fruit unloaded at London and Southampton is often shipped to distant internal markets which are nearer to other ports of discharge.

The Exchange pays all transport to the dealer, but the dealer pays unloading costs at his place of business, storage costs, and loading away after sale. If fruit is transferred from one dealer to another at the Exchange's request or if it is necessary to repack fruit because of decay, the costs would be for the Exchange account.

Pooling.--All sales are made on a pooled basis and returns are made to growers according to their participation in each pool by grade and count of fruit. Each season the Exchange operates three navel orange time pools, four Valencia time pools, three lemon time pools, one seedling orange time pool, and three midseason orange time pools to cover the odd varieties marketed between the Valencia and navel orange seasons. The last pool covers the last weeks of the shipping season, since arrivals in Europe should end in November to avoid competition with Mediterranean fruit.

Methods of Sale.--Dealer sales representatives sell all consigned fruit on a commission basis. The commission was reported to be less than 7 percent of the gross sales price in 1956. The dealer decides how much fruit shall be auctioned and how much shall be sold by private treaty. Auctions are usually held in port markets--London, Hull, Liverpool, and Glasgow. The auction prices tend to guide the private treaty market. More than half of the volume of citrus sold by the Exchange in recent years has been sold by private treaty.

The system of shipping fruit on consignment for sale on commission now extends to all major markets including the United Kingdom, Belgium, the Netherlands, Germany, Sweden, Switzerland, and Denmark. Sales to France and Norway have been under contract by which the price charged is the average London price the week prior to the delivery of the fruit.

The only sales by contract at fixed prices are to Eastern Europe.

Methods of Payment.--Dealers are billed upon allocation before the fruit is landed at a European port. The amount of the billing is about two-thirds of the expected market price. The funds are forwarded to Pretoria and received there about the time the dealer receives the fruit. A settlement of the entire account is made after the sale. It is obvious from this method of sale that the panel member dealers must have a substantial line of credit.

As soon as the advance payment is received in Pretoria it is paid out to growers. The amount of the advance is fixed each year.

Accounting Statistics.--All accounting for the European operation is carried out in the central London office by a modern punch card system which is necessary to allocate quickly the returns to each pool, determine the effectiveness of each dealer salesman, and ascertain the correctness of the market allocations.

Advertising.--An active advertising campaign has been carried on for a number of years in U. K. markets, in newspapers and weekly magazines. Point-of-sale material is made available to retail stores. All advertising stresses the first quality South African fruit under "Outspan" brand. The London office employs 16 dealer service representatives on a seasonal basis to distribute point-of-sale material to retailers in the United Kingdom. Some advertising has been done on the Continent in important markets and, as larger quantities of fruit become available, it is planned to extend advertising.

Inspection.--The Exchange inspects the fruit at markets. The British Isles staff consists of one chief inspector, four permanent, and four temporary, or seasonal inspectors. In sampling, one case out of every 300 is checked. If damage is discovered in any lot further checking may be done.

The inspectors make out a report identifying the vessel, port of discharge, and the place of stowage on the vessel; and they report on the condition, pack, and quality of the fruit. These reports are for use only with the Exchange. One copy is kept in London, another is sent to the South African Office in Pretoria, one goes to the area field officer in South Africa, and the original is sent to the packinghouse or the packer-grower. The purpose of these reports is to determine export quality and to get accurate evidence on the

TABLE 25.--Lemons and grapefruit: Total imports into specified European countries compared with imports from the Union of South Africa, 1954

Country	Lemons		Grapefruit	
	Total imports	Imports from South Africa	Total imports	Imports from South Africa
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Belgium	288	0	201	0
Denmark	134	0	22	0
France	1,324	0	365	0
Germany	2,450	4	152	2
Netherlands	163	2	98	1
Norway[1]	---	---	---	---
Sweden	136	9	58	2
Switzerland	349	3	207	6
United Kingdom	847	46	1,462	273
Total	5,691	64	2,565	284

[1] Not reported separately. Included with oranges.

TABLE 26.--Fresh deciduous fruits: Production in Western Europe, averages 1935-39 and 1945-49, annual 1953-55, and percentage increase 1955 over 1935-39

Commodity	Average		1953	1954	1955	Increase of 1955 production over 1935-39 average
	1935-39	1945-49				
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*Percent*
Apricots	134	162	288	184	173	29
Cherries	416	551	697	710	718	72
Plums and prunes	1,256	1,208	2,451	1,515	1,885	50
	Million bushels	*Million bushels*	*Million bushels*	*Million bushels*	*Million bushels*	*Percent*
Peaches[1]	19	21	38	34	38	97
Pears:[2]						
Cider	27	17	30	26	28	3
Other	43	64	88	78	81	87
Total	70	82	117	104	109	54
Apples:[1]						
Cider	164	83	161	144	145	11
Other	126	168	233	264	199	58
Total	289	250	394	408	345	18

[1] 48-pound bushels.
[2] 50-pound bushels.

TABLE 27.--Oranges: Percentage of specified varieties, rated first grade, Union of South Africa, 1948-50

Producing area (Province and district)	Navels	Midseason	Valencias
Transvaal:	*Percent*	*Percent*	*Percent*
Western (Rustenburg)	86.8	71.6	86.0
Northern (Tzaneen)	65.0	70.3	70.4
Eastern (Nelspruit)	57.8	72.1	73.4
Natal (Muden)	71.6	89.5	73.5
N.E. Cape (Grahamstown-Kat River)	80.9	96.1	80.3
Eastern Cape Coastal (Sundays River)	85.4	85.8	86.1
Western Cape (Citrusdal)	77.1	77.5	77.1

Dr. N.A.B. Bestbier, An Economic Survey of Citrus Farming in the Union of South Africa, table 109.

TABLE 28.--Navel and Valencia oranges: Comparison of size composition in representative pools at selected packinghouses in six producing areas, Union of South Africa, 1955

Type and size count	Pool returns[1]	Producing area					
		Transvaal			Natal (Muden)	Cape Province	
		Northern (Tzaneen)	Eastern	Western		Eastern	Western
	U.S. dollars per box	Percentage distribution of sizes					
Navel oranges:							
80	2.41	0.1	3.3	1.9	0.1	0.1	0.7
96	2.64	6.7	14.3	1.0	.3	1.0	3.1
112	2.88	10.1	14.2	9.4	2.0	2.8	4.0
126	3.20	25.6	29.4	31.2	9.0	14.4	19.4
150	3.76	23.5	19.6	23.4	25.2	24.4	21.5
176	4.28	15.7	9.7	15.2	13.0	22.6	24.3
200	4.72	7.7	4.9	2.5	28.2	12.7	7.9
216	4.89	6.4	3.3	3.9	5.9	14.0	14.3
226	4.79	---	---	.1	---	---	---
252	5.20	2.6	1.0	1.1	12.2	5.6	3.0
288	5.30	.8	.2	.3	2.4	2.0	1.2
324	4.99	.7	.1	---	1.5	.7	.5
344	6.04	---	---	---	---	---	.1
360	4.70	.1	---	---	---	.1	---
396	5.56	---	---	---	---	---	---
442	3.08	---	---	---	.2	---	---
Valencia oranges							
80	3.29	---	---	---	---	---	---
96	3.41	.2	.6	---	---	.1	.1
112	3.59	.5	.9	.1	---	.5	1.2
126	3.78	3.5	7.5	3.1	.3	2.9	4.5
150	3.69	10.2	12.4	11.6	1.4	8.6	12.5
176	3.41	17.6	21.7	21.5	11.1	15.9	24.4
200	3.16	13.2	9.5	9.3	10.3	11.3	12.4
216	3.08	23.5	20.2	23.8	28.4	23.5	29.5
226	2.93	---	.6	.1	.3	---	---
252	3.01	16.2	15.0	14.8	27.0	18.3	7.9
288	2.90	8.1	6.2	7.8	9.2	9.1	4.9
324	2.60	4.0	3.1	3.2	8.8	4.8	1.7
344	2.61	---	---	.1	---	---	---
360	2.15	2.4	1.8	3.5	2.3	3.6	.9
396	1.94	---	---	.3	.6	.1	---
442	1.69	.6	.5	.8	.3	1.3	---
		Weighted average: Pool returns					
		Dollars per box	*Dollars per box*	*Dollars per box*	*Dollars per box*	*Dollars per box*	*Dollars per box*
Navel	---	3.74	3.42	3.52	4.32	4.16	4.01
Valencia	---	3.16	3.25	3.16	3.03	3.11	3.25

[1] F.o.b. packinghouse.

South African Co-operative Citrus Exchange, Ltd.

TABLE 29.--Lemons and grapefruit: Percentage rated first grade in indicated areas in sample groves, Union of South Africa, 1948-50

Producing area	Lemons (First grade fruit)	Grapefruit (First grade fruit)
Transvaal:	*Percent*	*Percent*
Western (Rustenburg)	79.9	54.9
Northern (Tzaneen)	56.8	74.6
Eastern (Nelspruit)	59.0	65.5
Natal (Muden)	0	69.1
N.E. Cape (Grahamstown-Kat River)	51.7	87.2
Eastern Cape Coastal (Sundays River)	66.2	82.1
Western Cape (Citrusdal)	82.5	73.6

Dr. N.A.B. Bestbier, An Economic Survey of Citrus Farming in the Union of South Africa, table 121.

condition of fruit as it arrives in port. If the report from the market area differs greatly from that of the inspection report, the fruit may be reinspected at the dealer's place of business. This way a control is kept on the sales distributors and additional information is provided the grower.

A qualified field officer from South Africa thoroughly familiar with cultural and technical problems is attached to the London marketing office. He coordinates the marketing problems with those in South Africa. He advises the producers and packers on how to improve quality and how to further reduce decay.

This inspection system applies only to fruit received in the United Kingdom--about two-thirds of total exports to Europe in the past. The fruit shipped to the Continent is not inspected this way since the Exchange relies on the reports of importers' inspectors in the continental fruit markets. If reports of excessive decay are received, however, an inspector might be dispatched to the Continent, at the discretion of the continental manager, to obtain first-hand information on the fruit condition.

Export Season. --South Africa's major citrus exports are made from about Apr. 15 to Oct. 20. The voyage to Europe together with loading and unloading time requires about 1 month.

South African navel oranges are marketed in Europe from about May 15 to Aug. 1 with peak volume about July 1. Arrivals are smaller in August--between the end of the navel orange export season and the beginning of the Valencia season--than in July or September. In the future, the new plantings of midseason varieties should eliminate this gap between the seasons and the volume of exports should be more consistent (appendix table 42).

Valencia oranges are marketed in Europe from about Aug. 1 to Nov. 20 with peak volume about Oct. 1. California oranges are in competition with South African Valencias from about Aug. 1, but this competition is not heavy until about Sept. 15 to Oct. 1, when California is near the end of its normal export season and new crop South African Valencias are competing with old crop California Valencias. For example, in 1956, the California Valencias being sold in Europe in August were fruit of the bloom of April 1955, while the South African Valencias marketed in Europe during the same month were fruit of the bloom of September 1955.

Fruit is not offered on continental markets until the United Kingdom is fully supplied. The first auction sale of South African oranges in 1956 was made in London about May 30, while the first sales at auction in Rotterdam, Hamburg, and Antwerp were about June 27. In the future, as larger quantities of South African oranges become available, it is likely that sales on the Continent will be made earlier in the season and that California fruit will be competing with South African fruit from about June 1.

The lemon export season is slightly different. It begins in April and is heavy to Sept. 1. The peak occurs in the months of June and July. South African lemons, therefore, compete with the summer Italian Verdelli, the Spanish Verna, and summer California lemons.

The export season for grapefruit is almost identical to that for lemons. Major shipments are made from May through September. South African grapefruit competes mostly with California grapefruit.

Total Exports.--Orange exports have increased rapidly in the last 4 years--each year from 1953 to date has been a record (table 20). As new plantings come into bearing a production may be available which will make it possible to export 9 million boxes by 1961 and 11 million by 1964.

Lemon exports from South Africa do not have as consistent a history as do oranges. Important quantities have only been exported since 1949--65,000 boxes were exported in 1954. Production should increase rapidly as new lemon plantings come into bearing and it is possible that 250,000 boxes will be available for export by 1961, and 350,000 boxes by 1964.

Grapefruit exports have been well maintained since 1945, but since 1951 have been lower than the peak years 1948-51. "Stem pitting" disease has destroyed many grapefruit groves and caused production difficulties. Grapefruit exports can reach 400,000 boxes by 1964.

Export Customers.--In 1954, South Africa exported fresh citrus fruits to 31 countries. While exports were widely dispersed, especially for oranges, Europe was the primary customer.

Of the 5.3 million boxes of oranges exported, over 5 million were sent to Europe (table 21). But, there, South Africa's market has been restricted to soft currency areas, such as the United Kingdom and France.

Experimental shipments have been made to Canada; but the low prices obtained were disappointing.

For lemons, too, South Africa finds Europe its best outlet. It is interesting to note that South African lemons were exported to Sweden and Germany; this is probably because South African lemons tend to be of large size, which is acceptable to Northern European markets, particularly Sweden.

For grapefruit, the United Kingdom appears to be about the only outlet. Apparently, this variety of South African citrus is little known in the continental European markets.

With more fruit available for export in 1955, the pattern of orange exports changed. Germany took nearly one-half million boxes--10 times the 1954 volume. In the future South Africa will strive to market increasing supplies of fruit in continental European markets. Recent prices obtained in the United Kingdom indicate that expansion of markets there will not be profitable.

The success of South African postwar marketing is based on the Exchange controls which have given the United Kingdom's summer market to South Africa--with the assumption that the United Kingdom will not recover sufficiently to again become a free citrus market.

Export Facilities.--South Africa's port facilities for the export of fresh citrus are excellent. The packinghouse facilities are also modern and adequate. The weakest part of the export facilities is the rail transportation from packinghouse to port. The railroad is all narrow gage, and is slow. Most of the export citrus travels over 500 miles by rail, which usually requires at least a week. Some export fruit is shipped over 1,000 miles, requiring about 10 days to reach port. All rail transportation is in unrefrigerated cars. The fruit must withstand hot days and, often, near freezing nights. There are no indications that the government -owned and -operated railroad will provide refrigerated cars or more rapid service in the near future.

The government railways also control truck transportation and they are said to discourage the development of competing motor truck usage.

Small quantities of oranges are still shipped in ventilated stowage. As export volume increases, shipping space from South Africa to Europe may be inadequate.

Port Facilities.--South African citrus is exported from five ports, four of which are in the Union of South Africa and one in Mozambique (table 19). Of the five, Capetown is the most important, handling 2.6 million boxes in 1955. Port Elizabeth is second, and East London and Durban are of about equal importance. The smallest quantity of export fruit was handled by Lourenco Marques, the Portuguese port.

In 1955, the five ports had a combined precooling capacity of about 300,000 boxes of citrus (table 22). Additional facilities are under construction at Lourenco Marques, Durban, and Port Elizabeth, which will add storage for about 125,000 boxes by 1959--about 100,000 boxes of which may replace present facilities. The projected 1960 precooling facilities for citrus will total from 325,000 boxes to 425,000 boxes plus additional deciduous facilities at Capetown which could be used for 53,000 boxes of citrus.

All these port facilities are at dockside, where ships may be loaded directly from precooled storage. In storage, oranges are kept at 40° F. and lemons and grapefruit at 52° F. Oranges to be shipped by ventilated stowage are cooled to only about 50° F. In 1955, total handling cost including precooling and agent fees was about 17 U. S. cents per box.

Rejected Exports.--Final export inspection is made at the ports and, in 1955, about 155,000 boxes of fruit were rejected (table 19). The rejected fruit was regraded and repacked at the port. Approximately 64,000 boxes were repacked and exported and about 81,000 were packed in 30-pound mesh bags for domestic sale. About 7,000 boxes were lost in decay and shrinkage and about 2,000 boxes were returned to growers. The rejections at port were less than 2-1/2 percent of total shipments--a remarkable record.

EUROPEAN CITRUS IMPORTS

Oranges

Europe has been an expanding orange market. Nine major importing countries (table 23) almost tripled their orange imports between 1938 and 1955, and other continental European countries doubled their imports.

The United Kingdom, South Africa's major market, has not followed this trend in expanding orange consumption. In 1938, the United Kingdom imported 16.6 million boxes of oranges, making it the world's largest importer. In 1955, it imported only 12 million boxes and dropped to third in importance; both France and Germany took more imports.

This is an exceedingly important factor in evaluating South Africa's export market prospects. England, the major South African market, where over 60 percent of the 1955 orange exports were sold, imported 27 percent fewer oranges in 1955 than in 1938. This seems to indicate that markets will have to be expanded on the Continent.

The greatest increase in European orange consumption has occurred during the Mediterranean-producing season (November-April). The nine major European market areas imported a total of about 58.9 million boxes of oranges between November 1954 and October 1955; 46 million boxes were imported between November and April and only 12.8 million between May and October. See table 24.

Lemons and Grapefruit

South African lemons and grapefruit are subject to all the general factors affecting oranges. In addition, grapefruit has special problems.

For summer grapefruit, South Africa is almost an exclusive supplier of the United Kingdom, and in 1954 furnished about 18 percent of England's total imports (table 25). There is small opportunity to increase sales.

Continental Europe is a small consumer of grapefruit. In 1954, the eight major continental markets imported only 1 million boxes from all sources. The low consumption level limits market development opportunities.

The poor quality of South African grapefruit is the greatest handicap to the expansion of export markets.

COMPETITION IN EUROPEAN MARKETS

Oranges

Supplies of non-South African oranges available for sale in European markets during the European summer are likely to be maintained. Orange production in Brazil is now ranging from about 32 million to 37 million boxes per year. In 1950, Brazil exported over a million boxes of oranges to Europe, in 1953, one-half million boxes, and in 1955, over 650,000 boxes. Indications are that Brazil will maintain European exports at about these levels.

California Valencia orange production has declined, but export supplies are expected to be maintained because of an abundance of small-size fruit.

Lemons

The problems of marketing lemons are different. In Europe, South African lemons have to compete directly with Mediterranean lemons from Italy and Spain. Production from these areas is expected to increase. The total crop can reach 16 million boxes by the 1960-61 season. As the quantity of Mediterranean lemons increases, the quality of the fruit sold in Europe will probably be better. In addition to the growing Mediterranean supplies, California has been exporting increasing quantities of lemons to Europe. The California fruit has outsold Mediterranean lemons.

Deciduous Fruit

The South African export citrus marketing season is the same as the Western European deciduous fruit season. Supplies of European deciduous fruits and berries have been increasing (table 26). Trade sources indicate that when the first berries, peaches, and apricots become available the public loses its keen interest in citrus. Much of the deciduous fruit and berry production is in home gardens. Certainly, Europeans are limited orange customers when their own garden fruit is in season.

The abundant supplies of competing fruit places limits on the quantities of oranges which can be marketed in Europe from May to November. If the volume of orange imports is increased substantially, marked decreases in prices must occur.

MARKET ACCEPTANCE AND QUALITY OF SOUTH AFRICAN CITRUS

Quality

Size.--An important aspect of fruit quality and market acceptability is size. South Africa's oranges and lemons are large and grapefruit small (table 30). The majority of the

TABLE 30.--Oranges, lemons and grapefruit: Exports by size, from the Union of South Africa, to Western Europe, 1955

Size	Oranges			Size	Lemons	Size	Grapefruit	
	Navel	Valencia	Other (mid-season)				Seedless	Seeded
	Boxes	*Boxes*	*Boxes*		*Boxes*		*Boxes*	*Boxes*
64 - 80..........	33,050	578	8	100 - 120.......	1,154	36 - 46......	919	134
96..............	131,477	12,663	50	126............	26	54...........	3,742	819
112..............	155,023	24,253	428	140............	3,830	64...........	11,494	2,041
126..............	436,593	155,925	3,911	150 - 160......	5,166	70...........	18,015	2,611
150..............	465,781	345,461	12,317	170 - 180......	10,059	80...........	52,264	6,291
176..............	360,666	569,686	18,722	200 - 210......	13,172	96...........	82,266	7,227
200..............	175,995	362,661	15,745	220 - 240......	11,664	100..........	955	---
216..............	163,160	711,251	33,092	250 - 270......	14,147	112..........	74,101	6,139
226..............	18,165	15,928	1,190	290 - 300......	9,252	126..........	91,305	5,336
252..............	86,313	514,884	36,898	310 - 340......	9,139	150..........	45,982	2,509
288..............	34,596	280,055	26,382	350 - 360......	203			
324..............	16,173	144,875	18,843	378............	5,970			
344..............	118	616	29	390 - 400......	1,662			
360..............	6,171	114,267	16,303	420............	5,516			
442 and over.....	815	32,812	8,386	442............	41			
				462 and over...	77			

South African Co-operative Shipping Service, Ltd., Report on Shipping, Clearing, and Forwarding, 1955, p. 6 and 7.

TABLE 31.--Oranges, lemons, and grapefruit: Estimated production and exports, Union of South Africa, 1961 and 1964, compared with 1954

Year and kind	Production	Exports
	1,000 boxes	*1,000 boxes*
Oranges:		
1954[1]..	8,516	5,693
1961..	12,500	9,000
1964..	15,000	11,000
Lemons:		
1954[1]..	147	83
1961..	500	250
1964..	750	350
Grapefruit:		
1954[1]..	442	288
1961..	600	350
1964..	600	400

[1] Actual production from the 1954 bloom and actual 1954 exports.

TABLE 32.--Citrus, fresh: Quantity bought and prices paid by South African Canners Association members, by variety, 1950-55

Year	Sweet oranges		Seville oranges		Tangerines		Grapefruit		Lemons		Limes	
	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price	Quantity	Price
	Tons	*U. S dol. per short ton*	*Tons*	*U. S. dol. per short ton*	*Tons*	*U. S. dol. per short ton*	*Tons*	*U. S. dol. per short ton*	*Tons*	*U. S. dol. per short ton*	*Tons*	*U. S. dol. per short ton*
1950-51.....	8,596	34.67	1,363	42.39	---	---	2,818	22.94	352	28.93	---	---
1951-52.....	4,223	30.97	1,389	45.78	16	45.53	2,571	27.63	223	29.92	9	34.46
1952-53.....	3,098	36.26	1,541	50.00	---	---	3,126	30.03	120	29.33	1	35.58
1953-54.....	4,505	29.40	571	40.96	---	---	2,609	29.60	179	30.16	---	---
1954-55.....	5,587	27.38	1,175	34.55	---	---	2,518	28.79	161	28.60	---	---

South African Fruit and Vegetable Canners Association, Capetown.

TABLE 33.--Oranges and grapefruit: Comparison of auction prices of oranges, size 288, from South Africa and California at Rotterdam, Hamburg, Antwerp, and London; and grapefruit, size 126 at London, on specified dates, 1955 and 1956

Auction date	Oranges, size 288		Oranges, size 288		Oranges, size 288		Oranges, size 288		Grapefruit, size 126	
	Rotterdam		Hamburg		Antwerp		London		London	
	South Africa	California	South Africa	California	South Africa	California	South Africa	California	South Africa	California
	U.S. dollars per box	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*	*U.S. dollars per box*
1955:										
Aug. 10	7.70	7.38-7.57	---	---	5.50-6.80	5.40- 6.80	---	---	---	---
17	5.53-5.86	5.92-7.12	---	---	7.00-7.50	7.00- 7.50	5.81	5.81	---	5.74
24	4.87-6.39	6.19-7.44	4.79-5.26	---	---	7.60- 8.60	4.83	3.85	4.20	---
31	---	7.42-7.95	3.89-5.27	---	5.60-7.00	8.00- 9.40	5.60	---	4.62	---
Sept. 7	---	7.94-8.60	4.73-5.57	---	5.30-6.10	6.40- 7.80	4.55-4.90	---	4.06-4.55	---
14	6.49-6.22	7.48-7.68	5.57-5.63	---	---	6.00- 7.80	3.50-3.64	---	3.29	5.81
21	5.89-6.09	6.95-7.35	---	---	5.40-6.90	7.60- 7.80	4.06-4.26	---	3.99-4.06	---
28	5.43-6.16	7.15-8.01	5.25-6.04	---	6.00-6.20	7.80- 8.20	3.78-3.99	---	---	---
Oct. 5	5.68-5.94	7.59-7.73	---	---	6.10-6.30	8.00- 9.00	4.34-4.76	6.02	---	---
12	6.08-6.27	7.52-8.58	5.62-6.10	---	6.00-6.50	8.20- 9.20	4.90-5.04	6.94-7.00	---	---
19	5.94-6.14	8.46-9.12	---	---	6.40-6.50	8.00- 9.20	4.90-4.97	---	---	---
26	6.60-6.87	8.92-8.98	6.16-7.01	---	6.40-6.60	---	5.32-5.74	7.08	---	---
31	---	---	---	---	---	---	6.02-6.16	---	---	---
Nov. 2	6.67-6.74	9.18-9.25	---	---	6.20-6.70	---	---	---	---	---
9	7.13-7.59	8.58	---	---	---	---	4.90-4.97	---	---	---
16	6.80-6.93	---	---	---	---	---	3.78-3.92	---	---	---
21	5.94	---	---	---	---	---	---	---	---	---
1956:										
May 9	---	---	---	10.38-11.32	---	9.60-10.60	---	10.22	---	---
16	---	8.00-8.56	---	7.88- 8.58	---	8.80- 9.28	---	11.06	---	---
23	---	5.24-7.86	---	7.76- 8.94	---	8.20- 9.20	8.05-8.40	9.80	---	9.94
30	---	7.48-8.14	---	7.42- 8.60	---	8.60- 8.80	8.82-9.10	8.54-8.68	---	11.48
June 6	---	7.34-8.14	---	8.86- 9.22	---	7.80- 8.80	7.91-8.12	8.12	8.19	---
13	---	9.06-9.84	---	7.26- 9.10	---	8.40- 9.40	4.41-5.23	6.16-6.30	---	10.08
20	---	8.14-9.32	---	6.56- 7.64	---	8.80- 9.40	3.22-4.48	5.60	6.23-9.28	7.28-7.92
27	6.44-7.23	6.96-8.54	6.49-8.02	---	5.50-5.90	7.80- 8.80	4.76-5.04	4.68-5.18	3.92-5.81	6.92-7.14
July 4	5.00-7.10	4.34-6.04	6.60-7.14	---	6.20-7.10	7.60- 8.00	4.20-4.76	3.08-3.50	4.62-4.90	6.44-6.58
11	5.98-6.18	5.38-6.82	---	6.96- 9.72	---	---	5.46-5.88	---	4.83-5.18	6.02
18	4.69-6.31	5.78-7.76	---	---	5.20-5.70	6.60- 7.40	6.23	---	4.66-5.05	6.58-7.00
25	4.54	4.34-7.64	5.94-6.24	7.20- 8.52	5.70-6.60	6.80- 7.20	6.16-6.30	---	5.46-5.81	6.72
Aug. 1	5.66-6.65	6.98-7.90	5.88-6.54	7.44- 7.92	---	---	5.60-5.81	---	6.44-6.65	7.00-7.28
8	6.84-7.56	7.62-8.80	6.95-7.49	7.92- 8.14	---	---	5.32-5.60	---	6.16-6.65	6.72-7.00
15	5.52	8.16-8.94	6.53-7.01	6.82- 7.42	6.20-7.60	6.80- 7.80	4.20-4.97	---	4.83-5.04	---
22	5.07-5.26	4.60-6.18	5.63-6.47	6.10- 7.42	5.60-6.80	6.20- 6.80	5.46-6.02	---	4.76-5.25	---
30	4.87-5.72	6.06-8.42	4.26-4.80	---	4.80-5.20	6.00- 6.80	4.69-5.25	---	5.88-6.16	6.10-6.16
Sept. 5	5.13-5.79	5.92-7.76	5.16-5.64	6.00- 6.12	5.00-5.80	7.00- 8.00	4.48-4.55	---	---	3.64
12	5.47-6.12	5.40-5.79	5.04-6.12	5.28- 6.72	5.00-6.20	6.40- 7.60	4.90-5.14	---	4.48	4.34
21	5.07-5.93	6.20-7.50	5.57-6.35	4.91- 6.35	---	6.40- 7.00	4.62-5.04	---	4.62-4.76	---

Market reports of Comtel Reuter.

TABLE 34.--Oranges: Comparison of auction prices of California and South African oranges, by size, London, Rotterdam, Hamburg, and Antwerp, on specified days, 1956

Size	London[1]						Rotterdam		Hamburg		Antwerp			
	May 30, 1956		June 20, 1956		June 27, 1956		Aug. 2, 1956		Aug. 8, 1956		July 20, 1956		July 27, 1956	
	South Africa	California	South Africa	California	South Africa	California	South Africa	California	South Africa	California	South Africa	California	South Africa	California
	U. S. dol. per box	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*	*U. S. dol. per box*
96	6.79	---	4.27	---	5.18	---	5.94-6.13	---	5.69-5.75	---	---	---	---	---
112	7.00	---	4.20	---	5.25	---	5.54-6.20	---	5.69-6.35	---	4.30-5.00	---	4.20-4.60	---
126	7.56	---	4.27	---	5.32	---	6.07-6.53	---	6.59-6.95	---	5.20-5.40	---	5.30-5.60	---
150	8.40	---	4.48	---	5.32	---	5.94-6.99	8.71	7.19-8.14	---	5.40-5.70	---	5.70-6.60	---
176	8.89	---	4.27	---	5.18	---	5.94-6.46	---	7.66-8.38	---	5.60-6.00	---	---	---
200	8.89	9.24	4.27	---	5.32	5.04	5.94-6.40	9.76	8.14-8.50	7.66-8.26	---	---	4.40-5.00	---
216	8.89	---	3.99	---	5.18	---	5.94-6.66	---	8.14-8.74	---	---	---	---	---
220	---	9.38	---	---	---	---	---	7.92-9.50	---	---	---	---	---	---
252	8.96	8.96	4.41	5.74	5.25	5.18	5.94-6.66	7.52-8.97	8.02-8.38	7.78-8.86	5.20-5.70	8.40-8.80	5.70-6.60	8.20-9.00
288	8.96	8.68	3.92	5.60	4.76	5.18	5.67-6.66	6.99-7.92	6.95-7.49	7.43-8.14	5.20-5.70	6.60-7.40	---	6.80-7.20
324	8.54	---	4.20	---	4.48	---	5.61-6.66	---	6.11-7.31	---	---	---	4.60-5.40	---
344	---	7.84	3.78	4.90	---	5.18	---	7.52-8.05	---	6.95-7.66	---	6.00-6.80	---	6.20-7.00
360	---	---	---	---	---	---	5.94-6.66	---	5.75-5.89	---	---	---	4.60-5.40	---
392	---	---	---	---	---	---	5.94	6.33-7.92	---	---	---	---	---	---
442	---	---	---	---	---	---	5.54-6.13	---	---	---	---	---	---	---

[1] Auction quotations of California oranges ended about July 1956.

Trade reports on auction prices. Converted at official rates of exchange.

grapefruit shipped ranged from size 80 to 126, with the largest volume in size 126. This small-size grapefruit has an advantage in European markets.

Lemon sizes are mostly larger than those in commercial use in the United States. In 1955, over half the shipments were in sizes 170 to 270 fruits per box, inclusive. These very large lemons are at a disadvantage in export--only a limited volume can be sold in Europe.

Navel oranges are also large. Over 90 percent of the navel oranges shipped to the United Kingdom in 1955 ranged from sizes 96 to 216. These are very large sizes for European markets.

Valencia oranges range somewhat smaller. The greatest volume of fruit shipped is in sizes 252, 216, and 176. This is a more favorable range for European markets.

In the future, as export volume increases, it is likely that the export counts will be "trimmed" to meet the new market conditions. Oranges of size 112 and larger and 360 and smaller and lemons size 200 and larger will probably be eliminated from export. Disposing of these unpopular sizes will create additional problems in the domestic market. The small sizes of oranges will probably be readily accepted by processors as long as they are sold at a discount. Increased sales of small fruit to processors will tend to reduce returns on domestic sales since they will substitute for higher priced larger fruit.

When young groves come into bearing the average size of oranges and lemons will tend to increase as vigorous young trees bear a higher percentage of large fruit than full bearing older trees.

The size of Valencia and navel oranges raised in 1955 in six producing areas is shown in table 28. These data were obtained from packouts of selected packinghouses and may be considered fairly representative. The sizes are indicated as the percentage of fruit of each size packed.

All of the Transvaal produces large-size navel oranges. The Northern and Western Transvaal packs over 50 percent in sizes 126 and larger. In contrast, Natal and Cape Province grow small navel oranges.

The size differences between areas are not so marked with Valencia oranges. In the Eastern Transvaal and Western Cape 50 percent of the packout was 200 and larger. In Natal and Eastern Cape, sizes are a little smaller.

These size differences affect grower returns (table 28). To illustrate the effect of size on grower returns the percentage of fruit of each size packed has been multiplied by the returns for that size to obtain the weighted average pool returns per box.

There is a differential of over 90 cents per box between the Transvaal and Natal due to the size of the fruit produced. Generally, Natal and all of the Cape Province produces a favorable size range of navel oranges. It is obvious that, if a grower in Natal or Cape Province can obtain comparable yields with the Transvaal, he will be in a favored position.

Grade.--Grades of fruit produced are a significant quality factor. The percentage of fancy lemons and grapefruit packed in sample groves is indicated in table 29. Since the sample involved a total of over 500 growers for the 3 years covered, it is fairly representative of the packout of these two varieties.

For lemons the packout in the three most important producing areas for first grade fruit ranged from 56 to 59 percent. This small percentage of first grade fruit confirms that the South African lemon is of poor quality from the standpoint of external appearance.

First grade grapefruit packout is slightly higher--ranging from 65 to 82 percent.

The packout of navel oranges in the Northern and Eastern Transvaal compares unfavorably with that of the Cape Province (table 27). There was less difference in the packout of the three most important Valencia orange producing areas.

There is a great difference in the grade of fruit produced in the seven major producing areas. The "Florida" of South Africa, the Northern and Eastern Transvaal, has poorer packouts than the other orange producing areas. This difference has not been of great importance, since there has been little difference in grower returns between grades of fruit. In the future, as the industry becomes more competitive, the producing areas with good packouts may have a competitive advantage over the Northern and Eastern Transvaal.

Maturity Standards.--The Union of South Africa has adopted citrus fruit maturity standards as a part of its export regulations. These standards regulate fruit appearance, condition, and juice quality. The eating qualities of the fruit expressed in terms of solids, sugar, and acid content are important to the consumer.

In South Africa, export oranges must have a minimum of soluble solids to acid ratio of 7 to 1[9] and California oranges must have a ratio of 8 to 1[10] for out-of-State shipments.

South Africa requires a soluble solids to acid ratio of 4.5 to 1 for export grapefruit and California, a 5.5 to 1 ratio for out-of-State shipments.

For export lemons, South Africa requires 36 percent juice, while California requires only 25 percent juice.

In April 1956, the Union of South Africa amended the citrus export regulations to permit the export of Valencia and other seeded orange varieties with minimum soluble solids to acid ratio of 6.1 to 1 provided that the fruit had a total soluble solids content of 11 percent and a minimum juice content of 47 percent. A minimum of 8.5 percent of total soluble solids is now permitted with a juice content of 50 percent and a soluble solids to acid ratio of 7 to 1 or more.

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[9] Union of South Africa citrus export regulations.

[10] State of California citrus maturity standard, 1955.

The method of sampling for maturity tests was also changed so that an inspector tested from the 10 poorest fruits of a random sample of 50 fruits. (See citrus export regulations in the appendix.)

These new method-of-sampling regulations raised export standards. It is no longer possible to blend mature fruit with immature fruit and still pass the export maturity test. Because of the new methods, fruit in the Tzaneen district of the Northern Transvaal and the Nelspruit district of the Eastern Transvaal had difficulty meeting the export requirements. In June 1956, packing was stopped in parts of these areas for about 2 weeks until fruit matured sufficiently to pass the export tests.

Growing conditions in South Africa are such that higher maturity standards would eliminate large quantities of fruit from export. Harvesting begins as soon as the fruit will meet export tests. Oranges are not "tree stored" as in California. South Africa, therefore, harvests most of its oranges at or near minimum export standards.

Pooling and Export Standards.--All of South Africa's citrus exports are pooled and returns paid on the basis of the number of boxes of each grade, size, and variety which a shipper contributes. This has advantages in distributing market fluctuations throughout the industry, but it also has disadvantages. When the system was first inaugurated, decay was also pooled. Later decay was charged against the brands concerned. The condition of the fruit then improved and loss from decay was reduced. The aim of the grower and packinghouse is to place as many boxes as possible in each pool. The system of pooling returns removes the incentive for any packinghouse to improve the quality of its fruit pack and places a premium on the pack which only meets minimum export standards.

Market Prices of South African Oranges

The real test of fruit quality is its market acceptance as expressed in terms of the price obtained compared to the price received by competitors. Auction prices are the best way to make such a comparison (table 33).

It is not possible to make a completely satisfactory comparison between California and South African oranges because California oranges are sold in Europe in sizes ranging from 252 to 344, with the greatest volume being in sizes 288 and 344. South African oranges are mostly larger. Size 288 has been chosen for comparison in table 33.

In the comparison, the periods Aug. 10, 1955 to Nov. 21, 1955 and May 9, 1956 to Sept. 21, 1956 have been chosen to utilize data for a whole summer market season and thus compare South African Valencia and navel orange prices with California Valencia orange prices.

In Rotterdam, California Valencias in size 288 consistently out sold South African Valencias, at times by more than $2 per box.

The price comparison in Antwerp is much the same. In the period Aug. 10, 1955 to Sept. 21, 1956, 18 days may be compared. Of these, California oranges sold at higher prices than South African fruit on 15 days.

In Hamburg, in the eight comparisons which may be made between July 25 and Sept. 21, 1956, the highest price for California oranges exceeded the South African price on 7 days and equaled it on 1 day.

In London, South Africa dominates the market and California oranges are sold only in limited volume and season. London has been a restricted market, with U. S. citrus imports authorized in limited quantities. In the period Aug. 10, 1955 to July 4, 1956, only 12 price comparisons may be made. On 3 days the price of South African oranges exceeded that of California size 288 oranges, on 2 days the highest prices were equal, and on 7 days the highest price for California oranges exceeded the price paid for South African fruit. Even here in South Africa's market, California oranges sold at favorable prices.

From these data it is apparent that size 288 California oranges are able to compete with size 288 South African oranges. These price data are the appraisal of wholesalers and importers in European markets. They are the people who often comment on the dryness of South African oranges and their rather poor eating quality.

For South African grapefruit, the market acceptance is illustrated by quotations on the Spitalfields auction in London. South African grapefruit is well known in London. Over 90 percent of South African grapefruit exports is sold in the United Kingdom.

In table 33 price comparisons may be made for 1 day in 1955 and 10 days in 1956. On Sept. 14, 1955, California grapefruit sold for over $2 per box more than South African. In the 10 comparisons in 1956, the prices were the same on 1 day, South Africa sold at higher prices than California on 2 days, and California fruit sold at higher prices on 7 days. On 4 days California grapefruit sold at over $1 per box premium. Clearly the market acceptance of South African grapefruit is poor.

A Price-Size Comparison.--To evaluate the whole price-size relationship between California and South African oranges, a comparison of the prices by size of oranges are given for 7 days in four Western European markets (table 34).

TABLE 35.--Union of South Africa: Estimated capacity of major juice plants in 1956 and potential expansion of existing facilities

Area and number of juice plants	Estimated plant capacity 1956		Potential plant capacity
	Plants	*Tons*	*Tons*
Transvaal	4	15,200	23,200
Natal	2	11,000	17,000
Eastern Cape	1	5,000	10,000
Total tons	---	31,200	50,200
Total boxes	---	936,000	1,536,000

TABLE 36.--Citrus sections and juice, canned: Production by South African Canners Association members, 1950-55

Year	Canned sections		Canned single strength juice[1]	
	Orange	Grapefruit	Orange	Grapefruit
	Cases[2]	*Cases*[2]	*Cases*[2]	*Cases*[2]
1950-51	89,292	35,035	66,190	7,793
1951-52	2,361	31,662	65,479	5,275
1952-53	1,369	46,264	51,576	6,018
1953-54	2,356	35,733	54,890	4,912
1954-55	4,220	35,665	89,720	3,882

[1] Mostly single strength, but also contains some concentrate. These data include the major production of these items but excludes production by non-Canners Association members.

[2] Cases of 24 No. 2 cans.

South African Fruit and Vegetable Canners Association, Capetown

TABLE 37.--Citrus marmalade: Production by South African Canners Association members, by type of marmalade, 1950-55[1]

Year	Sweet orange	Seville orange	Sweet and Seville orange	Grapefruit	Sweet orange and grapefruit
	Cases[2]	*Cases*[2]	*Cases*[2]	*Cases*[2]	*Cases*[2]
1950-51	98,483	192,494	15,226	17,728	10,826
1951-52	126,488	194,847	13,241	52,293	16,118
1952-53	36,079	194,402	3,239	7,411	29,381
1953-54	17,363	83,180	(3)	3,605	5,126
1954-55	38,653	203,262	(3)	7,719	5,414

[1] Does not include some production by processors not members of the Canners Association.

[2] Cases of 48 pounds.

[3] None of record.

South African Fruit and Vegetable Canners Association, Capetown.

TABLE 38.--Citrus peel and essential oil: Exports from South Africa by country of destination, 1954

Country of destination	Peel cut and drained	Candied peel	Lemon and orange oil
	Pounds	*Pounds*	*Pounds*
United Kingdom	3,047,556	---	26,858
Canada	62,984	---	500
New Zealand	1,000	---	2,000
Cyprus	504	---	---
Hong Kong	12,258	---	---
British Malaya	9,000	---	---
Kenya	19,732	---	---
Sudan	1,090	---	---
Uganda	2,330	---	---
British West Africa	2,403	120	---
Tanganyika	4,538	---	---
Mauritius	1,243	---	---
Saint Helena	1,758	---	---
British West Indies	46,302	---	---
British Guiana	9,580	---	---
Ireland (Eire)	31,440	---	---
South West Africa	7,910	446	---
Southern Rhodesia	52,224	---	612
Northern Rhodesia	7,934	48	---
Portuguese East Africa	4,712	---	---
Sweden	---	45	---
Australia	---	---	540
Germany	---	---	4,000
Other countries	1,365	---	12
Total	3,327,863	659	34,522

Dispatch of the Agricultural Attaché at Pretoria.

TABLE 39.--Citrus processing: Some items of cost, Union of South Africa, 1956

Item	Unit	Cost
		U. S. dollars
Tin cans:		
A-2(20 oz.)[1]	Each	0.045
A-10[1]	....do	.113
Paper cartons:		
For cases of 24 No. 2 cans	....do	.11
Freight, ocean, South Africa to United Kingdom:		
Concentrate	Gallon	.14
Canned juice	Case[2]	.36
Wages (Cape Province):		
Men, in plant	Week	14.00
Women, in plant	....do	9.80
Foremen, in plant	....do	22.40

[1] Prices quoted at the can manufacturers plant in Durban.
[2] Case of 24 No. 2 cans.

TABLE 40.--Citrus products: Some representative quotations, in London, for South African citrus products, 1956

Item	Unit	Place of quotation	Price
			U. S. dollars
Orange juice:			
Single strength[1]	Case[2]	CIF UK ports	3.85
Single strength	....do	CIF London	3.50
Single strength[3]	16 ounce can	....do	3.08
Grapefruit juice, single strength	....do	....do	3.50
Orange sections	Case[2]	....do	4.06
Grapefruit sections	....do	....do	4.34
Orange juice:			
65 Brix concentrate			
In casks with SO_2[3]	U.S. gallon	....do	3.73
In casks with SO_2[1]	....do	CIF UK ports	3.15

[1] Natal processors.
[2] Cases of 24 No. 2 cans.
[3] Transvaal processors.

Days have been chosen when reasonable ranges of California sizes were sold.

Table 34 indicates that, while the sizes sold are not comparable, the use of size 288 as a comparison of the market acceptance of the two sources of oranges is valid. The price of California size 288 oranges does not always exceed the price of other sized South African fruit, but it is near enough in all cases to indicate that in an open market size for size California oranges will usually outsell South African fruit.

OUTLOOK

South African Fresh Fruit Marketing

South Africa is facing a difficult marketing situation. It has rapidly increasing production of large size ordinary quality oranges. Domestic consumption is low. The export industry is highly organized and has excellent port facilities, but domestic transport is inadequate. Major citrus exports have been made to only a few countries--mostly restricted soft currency markets, such as the United Kingdom and France. Although exports do not compete with Mediterranean oranges, expanding European markets for South African oranges in the summer season will be difficult because of competition from other citrus areas and increasing European production of deciduous fruits.

The low domestic consumption and the citrus consuming habits in South Africa indicate that the domestic market is unlikely to be able to consume at profitable prices the surplus supplies that will be available in the future.

The data in table 31 summarize the current industry estimates of South African citrus fruit that will be produced in 1961 and 1964, together with targets established for exports. The exports of oranges indicated in the table will be achieved only with a major marketing effort. It is unlikely that Eastern European summer orange markets can be expanded to absorb the increases in South African supplies.

The most important factor in evaluating South Africa's marketing outlook is the market acceptance of South African oranges. The data on comparative selling prices in European markets illustrate that South African oranges show little difference between fancy and standard grades. They usually sell at discounts compared to California oranges. The lack of good eating quality is another deterrent to expanding markets.

The quality of South African citrus is not likely to improve because of the use of rough lemon root stock, the seasonal factors and low maturity standards, and the pooling system which does not encourage improvement in quality.

Larger supplies will probably markedly reduce South African returns.

The controlled marketing policies are not expected to be as successful on the Continent of Europe as they have been in the protected U. K. market, especially as competition increases.

Grapefruit will face marketing problems, but since it is not overplanted to the extent of oranges and lemons, the problems will not be as difficult. Thus, grapefruit, the poorest quality citrus South Africa produces, will probably have the fewest export marketing problems.

Lemon surpluses will probably be evident by 1961 and serious by 1964. South African lemons are large and not of good external appearance. Both factors limit export possibilities in the face of growing Mediterranean lemon production and increasing California exports. Some of the increased lemon supplies will be the Meyer lemons from the Northern Transvaal. These specialty fruits will be difficult to sell in Europe.

Domestic political difficulties in any foreign citrus producing area can be the most important competitive factor overriding all other considerations.

As increasing supplies of exportable fruit become available, the South African industry will face consequences which will further affect its competitive status in world markets. Returns will be lower and there will be increased competition between the South African citrus producing areas. The Transvaal, with high operating costs per tree, will be in the least favorable competitive position.

Contract shipping space is not being expanded at a rate to accommodate the citrus exports the industry expects in the near future. Steamship companies are not planning to expand capacity until they are sure the increased citrus volume can be sold. Increased volume of exports will be carried largely by chartered ships at world freight rates.

Relationship with Subsidiary Producing Areas

As increasing supplies develop marketing pressures, the Citrus Board of the Union of South Africa will encounter problems with the subsidiary producing areas. The Citrus Board controls marketing within the Union, but has no legal marketing control over the Portuguese territory of Mozambique or the two British territories of Swaziland and Southern Rhodesia. Whether the Citrus Exchange will continue to market fruit from these territories when South African growers are unable to sell their export fruit will become an important issue. It would seem that the Exchange cannot afford to refuse to market Portuguese citrus as long as South Africa uses the port of Lourenco Marques. The importance of this port will increase in proportion to the growth of production in the Transvaal.

Citrus production in Swaziland will be commercially important by 1961. If the Citrus Exchange continues to market

Swaziland fruit it will displace South African fruit in the available shipping space and will compete with it in European markets. The growth of Swaziland's citrus industry will create a critical need for coordination of marketing programs. This would seem to create a "climate" in which Swaziland may be invited to become a part of the Union of South Africa. If Swaziland does not become a part of the Union its citrus industry will probably break relations with the Citrus Exchange.

If Southern Rhodesia is again a citrus exporter by 1961, its export fruit probably would not be marketed by the Citrus Exchange.

The subsidiary citrus producing areas will increase South Africa's marketing problems whether they are associated with the Citrus Exchange or break away and become competitors.

Competition With U. S. Citrus

Oranges.--Increasing South African orange production will result in keen competition in Western Europe with U. S. summer oranges from California. The growing supplies of South African fruit will be focused on the continental European market since the U. K. market, now consuming 60 percent of South African exports, cannot be expanded greatly. The exportable oranges South Africa may have available could make possible a 3-million-box increase in continental European sales by 1961--nearly equal to total U. S. European exports.

South African navel oranges are not in the European market in volume until about June 15. Increased South African volume will, therefore, have little effect on early U. S. exports for arrival in Europe through June 15. The large-size South African navel oranges are marketed in Europe until about Aug. 1. Price comparisons indicate that even when South African navel oranges are available in volume, as in London in 1956, small California Valencias sell at favorable prices usually bringing a premium, because the California Valencia is a mature good eating fruit. The European market will be more competitive from June 15 to Aug. 1, but sharp decreases in U. S. export volume should not be expected. California oranges will meet the heaviest competition in Europe after Aug. 1 when South African midseason and Valencia oranges are available.

The summer European orange market will become more competitive in price. Assuming that by 1961 the South African ocean freight rate is increased to about $1.47 per box and other costs remain the same, the estimated break-even costs will be about $4.50 per box at U. K. ports. Until such an increase in freight rates takes place, South Africa can sell oranges at U. K. ports at $4.00 per box and still pay cash costs. Prices of $4.50 per box are possible in the next few years as South Africa attempts to market increasing crops.

The average return on U. S. summer orange exports to Europe will probably be lower than in the recent past. European importers will probably be less willing to make advance purchases of fruit for their own risk when increased volumes of South African oranges are offered for sale on consignment.

This outlook assumes that South Africa's new plantings will come into production and that export trade will not be interrupted. Should drought destroy new plantings and limit production or disease or political instability interrupt exports, South Africa's competitive potential will be reduced correspondingly.

The best means of meeting South African competition is with high quality fruit, well-grown and attractively packaged. The premium the European is willing to pay for California oranges is the best protection the United States can have against South African competition.

Lemons.--South African lemon exports may reach 150,000 boxes by 1961 and 200,000 by 1964. If the maximum indicated exports are achieved they will still be of minor importance. South African lemons represented only 4 percent of total European lemon imports in 1954. The United Kingdom will absorb most of the increase. On the Continent they will find a market mostly where large lemons are acceptable--Sweden, Germany, France, and the Netherlands.

The large South African summer lemon is of poor appearance and will not offer competition to California summer lemons. On Aug. 1, 1956 at Rotterdam, California lemons sold at $6.32 to $8.82 per box compared to $5.20 to $5.86 for South African lemons of similar size. California lemons may be expected to continue to sell at premiums over similar South African fruit.

This quality advantage should enable California to meet successfully any competition offered by South African lemons without reduction in returns or volume.

Grapefruit.--Grapefruit exports from South Africa will probably increase to about 300,000 boxes by 1961 and 350,000 boxes by 1964. This is above present levels but about equal to exports in 1948 to 1951. The increased supplies will be sold primarily to the United Kingdom. That California grapefruit can easily compete with South African is shown by comparative prices obtained in the fruit auctions in London where California grapefruit brings premium prices.

The supplies of South African grapefruit which are likely to be available in European markets should neither reduce the returns or the volume of U. S. summer exports to Europe. In the Rotterdam fruit auctions of Oct. 25, 1956, size 126 South African grapefruit brought $3.82 to $4.08 per box compared with $7.50 to $8.04 per box for the same size of Florida grapefruit. The Florida box is larger, but the premium obtained illustrates the comparative quality of the two fruits.

PROCESSING

South Africa's processing industry is widely scattered. The plants are located at ports or near large consuming areas, such as Johannesburg. All of the major plants existing in 1956 were multipurpose installations, which either canned or processed other food items or were soft drink bottlers who processed partly for their own operations.

There are no official statistics on the industry. The two trade sources of information are the South African Fruit and Vegetable Canners Association in Capetown and the Citrus Processors Association in Durban. These two organizations represent different segments of the industry. The Canners Association members are principally canners of grapefruit sections and single strength juice, while the Processing Association membership is mostly bottlers primarily interested in concentrated citrus juice.

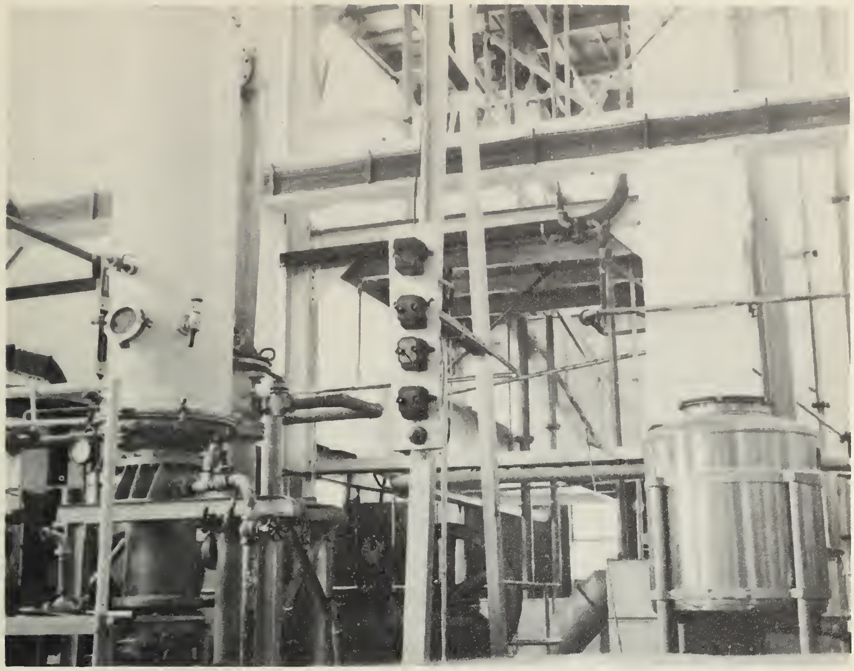
In 1955, the processing industry used about 600,000 boxes of fruit during the export season (table 17). Comparing the fruit purchases by the Canners Association members with total used for processing (table 17) indicates that in 1955 Canners Association members purchased about 35 percent of the sweet oranges used for processing, 15 percent of the lemons, and 96 percent of the grapefruit.

The estimated capacity of the juice plants in 1956 was about 1 million boxes of fruit annually (table 35). The existing facilities could be expanded to utilize 1.5 million boxes of fruit per year.

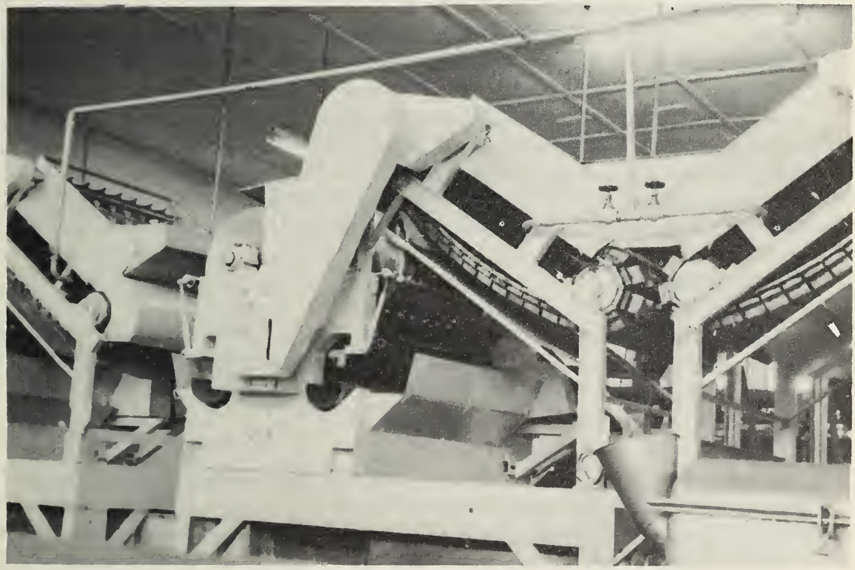
Citrus Sections

The 35,000 cases of grapefruit sections produced in the 1954-55 season were about average (table 36). Orange section production, with the exception of the 1950-51 season, has been small by comparison. The 4,200 cases produced in 1954-55 were about twice the average of the previous 3 years.

Most citrus sections are canned near Port Elizabeth; however small canning operations are carried on from Capetown to the Northern Transvaal. All citrus section canning is done in conjunction with other food processing and is usually a very minor part of the plant's operations. There are no indications that production will increase markedly in the future.



Orange juice concentrator. A large part of South Africa's concentrated juice is packed in casks for the "squash" industry.



Juice extractor. Nearly all canned juices are exported, primarily to the United Kingdom.

Single Strength Juice

Orange juice production increased in the 1954-55 season (table 36). The production of grapefruit juice is small, averaging about 4,000 cases per year--not including juice packed in casks for the "squash" industry. These data refer only to canned citrus juices, mostly single strength; however, some quantities of canned concentrate are also included. Nearly all citrus sections and canned juices are exported, primarily to the United Kingdom.

Concentrated Juice

Trade sources indicate that about 360,000 U. S. gallons of nonfrozen concentrate were produced in 1955. Of this about 110,000 gallons were sold in the domestic market--including the quantity sold to be used in "squash" and for bottled ready-to-drink beverages. Orange juice, concentrated 5 to 1, packed in casks, and preserved with SO_2 was the major item, but a small quantity of canned single strength juice was included. The rest of the production was exported, mainly to the United Kingdom.

South African processors indicate that average Valencia orange juice has a Brix of 10.5 to 13.5, an acidity of 1.3 to 1.8, and an average sugar acid ratio of 7 to 9.5. The Vitamin C content of the juice ranges from 50 to 65 milligrams of ascorbic acid per 100 cc of juice. Because of high acidity, most juice requires that sugar be added to make it into a palatable drink. Juice tests indicate that it is often substandard by U. S. grade because of poor flavor (bitterness).

All areas of production have the Mediterranean fruitfly and some areas also have the Natal fruitfly. Large-scale processing of fruit from fly-infested districts results in defects such as maggot eggs and insect particles in orange and grapefruit juice. Because of these defects, South African juice can be sold only in non-United States markets.

Marmalade

Large quantities of marmalade are produced for export to the United Kingdom. The production of the various types of this product for 1950 to 1955 are shown in table 37.

Peel

Another major export product is citrus peel. This is produced from brined peel and is usually candied, but not crystallized. It is diced into small pieces and shipped, drained, in wooden boxes to be used by the bakery trade. In 1955, most of the exports went to the United Kingdom (table 38).

Marmalade and candied peel for the bakery trade are the most important volume export of citrus products.

Essential Oil

In 1954, 34,522 pounds of lemon and orange oil (mostly orange), were exported. This was the major share of production. Only small quantities are used domestically. Over 26,000 pounds were exported to the United Kingdom. Germany was the next most important customer, taking 4,000 pounds. Exports are carried on privately with the European products trade.

Operating Problems

The South African processing industry obtains nearly all its fruit from the Citrus Exchange as a byproduct of the export fruit industry. Sales to processors are on much the same basis as sales to the fresh domestic market. Fruit is delivered in 30-pound mesh bags. It is sized into three groups and the smaller fruit is sold at the lowest price. Processors receive fruit by allocation and they may not select the sizes they wish to purchase.

Freight Rates on Processed Fruit.--Processors pay the same rail freight rates as the domestic fresh fruit industry --substantially above rail freight rates paid by the export industry. According to government regulations, bulk shipment of fruit does not give a freight rate advantage because freight is charged on the carrying capacity of the car not on the freight load carried. Thus, if a car of 10-ton capacity carries only 8 tons of fruit, freight is still charged at the 10-ton rate. Both the method of shipping and the freight rates are disadvantageous to processors.

Supply of Fruit.--In 1956, processors applied to the Citrus Board for 27,000 tons of small-size oranges. They were allocated only 11,000 tons of small fruit and had to take the remaining 16,000 tons in medium-sized fruit, which sold at a higher price.

Processors are opposed to receiving fruit in 30-pound mesh bags and feel that the price of fruit is high in relation to quality as expressed in fruit solids. It is obvious, however, that the fruit supply situation is in a state of transition and that, in the future, adequate supplies of fruit will be available.

From an objective viewpoint, South African processors have been fortunate to obtain supplies of fruit made available at relatively moderate prices. If the supply had been uncontrolled the fruit available to processors would have been small and the price high.

Costs.--Several cost factors of processing plants are given in table 39. Wages are low by our standards, but are considered high by the industry. Plants use large amounts of hand labor so the labor load per unit of product is high. All material is expensive.

The cost of tin is an important factor. First, all tin plate comes from the sterling area, which has higher tin plate prices than the United States. Second, South Africa does not use large quantities of tin containers and is not likely, therefore, to receive the cost advantages of large scale production. Third, Africa is isolated from the world supplies of tin plate and must pay high freight costs. A South African plant receiving cans from England is in a far different competitive position than a Florida plant which receives cans by conveyor from the can manufacturer next door.

South Africa has a further cost disadvantage in that every plant is a small operation and set-up costs are proportionately high.

Government Regulations.--In June of 1956, the Government of South Africa adopted a bill to "Provide for the Control of the Export of Canned Fruit and Canned Vegetables." Under the provisions of this act the Minister of Economic Affairs may completely control exports by requiring an export permit. These permits "may prescribe the quality and kind of canned fruit or canned vegetables which may be exported thereunder, the price at which, the period within which, the port from which, the country or territory to which, and the manner in which the canned fruit or canned vegetables concerned may be exported, and such other conditions as the Minister may direct." This will apply to citrus products and will give the government very complete control of foreign trade in processed products.

These controls eliminate competition within the industry. They are supported by South African canners who believe controls are necessary since production is primarily for export to European markets.

Controls may have advantages if they improve quality, but they could make South Africa less competitive in world markets.

The Competitive Situation

Like the fresh fruit industry, the South African processors have had a protected market in the United Kingdom. As a colony they do not pay duty. The industry is protected to a more important degree by the postwar foreign exchange controls of the United Kingdom. Since these exchange restrictions prohibited imports from the dollar area, South Africa has had little competition.

The market condition is illustrated by the 1956 quotations in table 40. This competitive situation is illustrated further by the fact that South African canned citrus juices are to be found only in restricted markets such as the United Kingdom. When Sweden had restrictions small quantities were sold there. No canned South African juice is found in Switzerland, Belgium, or the Netherlands.

In table 41 retail prices of citrus products in South Africa in 1956 are compared with retail prices in the United States. In Capetown, a #2 can of grapefruit juice was selling for 21 cents compared to an average of 14.2 cents in the United States. Other African retail prices were also higher by comparison. These high retail prices are evidence that South Africa will have difficulty competing in world markets.

Outlook

South Africa may be expected to maintain its level of exports to the United Kingdom of marmalade, citrus peel, and essential oil. The lower labor costs and the lack of duty charges should continue to make South Africa competitive.

Grapefruit sections have the least promising future. South Africa can never be competitive with Florida in a free market either on a quality or a price basis. South African grapefruit sections cannot even compete with West Indian sections.

The citrus juice industry is not in a favorable competitive position for trade development in world markets. Canned juices will continue to have the handicap of high tin plate prices. In addition, most juice production plants are located several hundred miles from the groves and must incur substantial freight charges.

Oranges tend to have high acidity which requires that sugar be added to most single strength juice. This limits the markets in which the juice can be successfully sold. Most European markets have high duties on juices containing sugar. The low solids and high acidity also add to the quality problems in producing concentrated juices.

South Africa will be most competitive with concentrated juice packed in casks and preserved with SO_2. This finds a ready market in the United Kingdom where it is used to produce "squash." Since South Africa pays no duty it will remain competitive. Exports to the United Kingdom may increase in the future to as much as 350,000 U. S. gallons of 65 Brix orange juice concentrate per year. No substantial increase in exports to continental Europe is expected. On the Continent, bottlers recently have been purchasing more canned concentrates. It is doubtful if South Africa can successfully compete for this market.

In the future some new products may be exported in small quantities. Frozen orange juice concentrate may be one of these.

South Africa has no competitive advantage that would lead to the development of a large processing industry. The South African citrus industry was created to produce fresh oranges outside the Mediterranean season. When fruit is processed South Africa abandons this seasonal advantage and is placed in direct competition with the world.

APPENDIX

South African Citrus Export Regulations.--Amendment Apr. 27, 1956.

"For the purpose of a test in respect of the internal maturity or the juice content of the fruit, the Inspector shall select from the random sample of 50 fruits with or without the aid of cutting, the 10 fruits which appear to be poorest in respect of the internal maturity factor or for juice content as the case may be, in respect of which he desires to subject the sample to test. Of the 10 fruits so selected, he shall discard the 2 worst and the 3 best in respect of the said factor and test the remaining 5 fruits; provided that in the case of lemons, 15 fruits shall be selected as above prescribed and of these 15 fruits the 8 best and the 1 worst lemons shall be discarded and the remaining 6 fruits used for the test. If the Inspector desires to subject a consignment to test in respect of two or more factors and the final test sample in respect of one of the factors for which it is desired to test consists of the same fruits as he would have selected for the other factor or factors for which it is desired to test, he shall use the same test sample for the tests in respect of such other factor or factors. If the Inspector would have selected completely different fruits from the random sample of 50 fruits in respect of the other factor or factors for which he desired to subject the sample to test, he shall select a test sample for such other factor or factors from the same random sample of 50 fruits. If, however, the Inspector would have selected partly the same and partly different fruits for the test sample in respect of such other factor or factors, he shall draw a separate random sample of 50 fruits to enable him to select the correct test sample for such other factor or factors."

TABLE 41.--Citrus products: A comparison of the retail prices in South Africa and the United States, by specified product

Item	Size of can	Retail price
		U. S. cents
Orange juice, single strength:		
South Africa[1]	No. 2	21-23
Florida[2]	No. 2	18
Frozen concentrate, orange:		
South Africa[1]	6 oz.	35
Florida[2]	6 oz.	17
Grapefruit juice, single strength:		
South Africa[1]	No. 2	21
Florida[2]	No. 2	14
Grapefruit sections:		
South Africa[1]	No. 2	25
South Africa[1]	16 oz.	23
Florida[2]	16 oz.	18

[1] Capetown--self service store--June 1956.

[2] Average price reported paid by representative sample of U.S. householders in November 1956--a comparable marketing season to June in South Africa.

Observations in retail markets.

TABLE 42.--Export citrus: Rail shipments by week, total and by producing areas, Union of South Africa, 1955

Week ending	Transvaal[1]	Natal (Muden)	Cape Midlands (Grahamstown)	E. Cape Coastal (Sundays River)	Western Cape (Citrusdal)	Total
	Boxes	*Boxes*	*Boxes*	*Boxes*	*Boxes*	*Boxes*
March:						
19	1,347	---	---	---	---	1,347
26	496	---	---	---	---	496
April:						
2	2,960	---	---	549	---	3,509
9	3,314	---	---	89	---	3,403
16	23,606	---	---	---	---	23,606
23	24,617	1,347	---	---	---	25,964
30	102,366	4,643	---	---	---	107,009
May:						
7	96,996	5,193	---	35	2,995	105,219
14	160,709	4,696	1,152	1,400	10,421	178,378
21	163,208	13,292	7,993	23,145	10,492	218,130
28	183,731	16,198	21,870	69,065	18,148	309,012
June:						
4	142,898	17,156	28,214	78,582	22,011	288,861
11	104,741	9,942	33,939	101,728	21,604	271,954
18	113,141	8,188	41,772	109,792	25,698	298,591
25	105,148	4,519	30,873	109,792	24,227	274,559
July:						
2	126,717	2,942	27,240	96,269	21,391	274,559
9	118,866	---	28,019	109,269	17,014	273,035
16	114,577	18	11,803	100,452	16,234	243,084
23	97,581	248	7,124	82,871	11,272	199,096
30	188,551	4,360	2,074	62,277	5,742	263,004
August:						
6	186,531	8,152	1,294	56,978	3,350	256,305
13	230,696	10,439	106	51,271	815	293,327
20	233,797	17,705	726	77,395	603	330,226
27	219,282	18,308	3,101	98,396	1,294	340,381
September:						
3	237,838	13,859	4,307	92,423	7,054	355,481
10	192,911	11,023	3,527	87,674	20,168	315,303
17	145,556	14,408	6,717	99,495	22,047	288,223
24	161,967	5,193	3,066	86,221	17,155	273,602
October:						
1	106,725	3,527	3,137	73,141	26,850	213,380
8	56,429	2,782	6,681	69,172	23,837	158,901
15	54,922	1,010	4,750	45,122	11,413	117,217
22	26,424	1,471	2,942	12,902	1,914	45,653
29	1,984	337	1,152	3,332	1,294	8,099
November:						
5	443	496	---	1,630	337	2,906
12	---	---	195	337	868	1,400

[1] Includes Northern, Eastern, and Western Transvaal: two-thirds of shipments are from Northern and Eastern Transvaal.

South African Co-operative Citrus Exchange, Ltd.

TABLE 43.--Union of South Africa: Climatic data in specified citrus producing areas

Area and month	Rainfall average	Temperature				Humidity[1]	
		Average maximum	Average minimum	Extreme maximum	Extreme minimum	8:00 a.m.	2:00 p.m.
Rustenburg:	*Inches*	°F	°F	°F	°F	*Percent*	*Percent*
January.............	4.6	87.08	62.42	102.92	48.02	---	---
February............	3.7	85.64	61.16	102.02	39.92	---	---
March...............	4.3	82.58	58.64	100.94	42.08	---	---
April...............	1.5	79.16	51.08	91.04	32.00	---	---
May.................	.7	73.94	42.44	91.04	21.02	---	---
June................	.4	69.44	36.14	84.02	21.92	---	---
July................	.2	69.08	35.24	82.94	21.92	---	---
August..............	.3	74.48	40.28	95.00	21.92	---	---
September...........	.7	80.78	48.02	98.06	28.04	---	---
October.............	1.9	86.00	56.12	98.96	37.94	---	---
November............	3.5	86.18	59.18	102.92	41.00	---	---
December............	4.5	86.90	61.34	104.00	47.12	---	---
Total.............	26.3	---	---	---	---	---	---
Fort Beaufort:							
January.............	1.6	84.92	59.18	109.94	44.24	---	---
February............	2.3	84.74	59.54	107.42	42.98	---	---
March...............	3.0	81.68	57.56	105.26	39.92	---	---
April...............	1.5	78.98	51.26	100.94	35.96	---	---
May.................	.8	72.68	44.24	96.98	20.94	---	---
June................	.5	70.16	39.20	84.92	17.96	---	---
July................	.6	68.72	38.84	86.54	24.98	---	---
August..............	.5	72.68	42.26	94.64	26.06	---	---
September...........	1.2	74.48	45.86	105.98	32.00	---	---
October.............	1.9	77.18	50.36	105.08	35.06	---	---
November............	1.9	80.06	54.68	105.44	39.92	---	---
December............	1.8	83.66	57.38	109.94	43.34	---	---
Total.............	17.6	---	---	---	---	---	---
Pusella:							
January.............	7.6	84.38	63.86	103.46	49.46	82	---
February............	6.1	83.48	63.86	103.82	51.44	85	---
March...............	6.8	81.86	61.52	100.04	46.94	88	---
April...............	2.9	80.24	56.12	96.98	35.06	87	---
May.................	.8	77.18	47.12	91.40	30.56	86	---
June................	.5	73.76	41.18	90.50	29.48	85	---
July................	.7	73.58	41.00	90.50	26.96	83	---
August..............	.5	76.64	44.24	94.46	28.58	79	---
September...........	.9	80.60	50.00	101.84	33.98	73	---
October.............	1.9	83.12	56.12	107.42	39.92	73	---
November............	4.6	83.84	59.72	106.16	42.98	76	---
December............	6.0	84.20	62.24	105.98	42.44	80	---
Total.............	39.3	---	---	---	---	---	---
Nietgedacht:							
January.............	4.0	87.62	59.18	105.98	46.04	---	---
February............	3.6	85.64	58.46	100.94	32.54	---	---
March...............	3.2	83.66	55.94	98.42	37.04	---	---
April...............	1.3	80.42	49.82	91.94	33.98	---	---
May.................	.7	75.56	42.80	90.50	30.20	---	---
June................	.4	70.34	36.14	82.04	26.96	---	---
July................	.5	69.08	35.60	82.94	24.44	---	---
August..............	.6	74.84	38.84	89.06	27.50	---	---
September...........	1.3	78.44	44.24	100.04	30.92	---	---
October.............	2.4	82.40	52.34	104.00	37.58	---	---
November............	3.6	83.84	55.40	105.08	35.06	---	---
December............	4.4	86.00	57.90	102.92	35.42	---	---
Total.............	26.0	---	---	---	---	---	---
Pietersburg:							
January.............	3.9	80.60	60.26	95.72	45.14	74	50
February............	3.0	80.06	59.36	93.74	40.10	76	51
March...............	2.7	78.44	56.48	92.48	40.64	79	49
April...............	1.1	76.28	50.90	87.62	31.82	77	43
May.................	.4	71.24	42.44	84.02	27.32	77	37
June................	.1	67.10	36.32	79.34	20.84	76	34
July................	.2	66.92	36.50	81.86	21.38	75	35
August..............	.2	71.06	40.46	85.46	28.04	70	33
September...........	.4	76.10	47.30	91.94	27.68	65	34
October.............	1.7	79.52	54.32	97.34	38.66	62	38
November............	3.2	79.70	57.20	98.78	40.10	67	44
December............	3.6	80.60	59.72	96.08	46.22	61	48
Total.............	20.5	---	---	---	---	---	---

TABLE 43.--Union of South Africa: Climatic data in specified citrus producing areas--Continued

Area and month	Rainfall average	Temperature				Humidity[1]	
		Average maximum	Average minimum	Extreme maximum	Extreme minimum	8.00 a.m.	2:00 p.m.
Nelspruit:	*Inches*	*°F*	*°F*	*°F*	*°F*	*Percent*	*Percent*
January	5.1	83.84	65.48	100.04	51.80	---	---
February	4.7	84.02	65.48	104.90	53.06	---	---
March	4.3	82.58	63.50	96.26	50.18	---	---
April	1.7	80.60	58.28	96.08	39.92	---	---
May	.7	77.00	50.54	92.48	34.88	---	---
June	.4	74.12	44.60	91.04	32.54	---	---
July	.4	73.76	44.24	91.94	30.56	---	---
August	.3	76.64	48.56	96.62	32.54	---	---
September	1.03	80.24	53.24	105.98	35.96	---	---
October	2.3	81.86	58.64	105.44	42.98	---	---
November	4.1	82.58	61.70	104.00	46.94	---	---
December	4.9	83.84	64.22	107.06	46.94	---	---
Total	29.9	---	---	---	---	---	---
Hermitage:							
January	.9	85.28	60.80	115.34	44.24	70	47
February	1.3	85.64	61.52	113.54	43.88	79	50
March	1.7	83.66	59.90	111.02	42.08	85	50
April	1.1	79.70	52.88	104.00	38.12	85	46
May	1.2	75.74	46.40	95.00	28.40	86	42
June	.7	72.50	41.36	88.16	28.40	83	38
July	1.0	71.06	41.00	91.04	27.14	83	42
August	.6	73.76	42.80	99.50	28.94	85	38
September	.8	75.56	47.30	105.26	28.94	79	41
October	1.9	77.36	51.98	105.98	35.24	73	51
November	1.9	79.88	55.04	109.76	41.36	70	49
December	1.1	82.76	58.10	110.30	43.88	68	47
Total	14.2	---	---	---	---	---	---
Clanwilliam:							
January	.1	95.72	61.34	114.98	42.98	---	---
February	.2	96.26	60.98	114.98	41.18	---	---
March	.3	91.44	58.82	111.92	39.38	---	---
April	.7	86.54	52.88	107.06	38.66	---	---
May	1.0	76.10	46.76	98.06	30.02	---	---
June	1.7	70.88	42.08	89.06	28.04	---	---
July	1.2	68.90	41.18	87.08	30.02	---	---
August	1.1	72.50	42.62	98.96	30.92	---	---
September	.7	76.80	45.14	105.98	31.10	---	---
October	.5	82.94	50.18	107.06	37.04	---	---
November	.3	90.32	55.58	111.92	39.92	---	---
December	.2	93.74	57.92	113.00	42.98	---	---
Total	8.0	---	---	---	---	---	---

[1] Relative humidity.

Official data from the South African Co-operative Citrus Exchange, Ltd. Average of recent years.

TABLE 44.--Oranges: Maximum prices on domestic sales, Union of South Africa, 1956

Grade and size	Producers prices	Wholesale prices	Retail prices
Naval oranges:	*U. S. dollars per box*	*U. S. dollars per box*	*U. S. dollars per box*
First grade:			
Extra large	2.26	2.36	2.57
Large	2.26	2.36	2.57
Medium	1.98	2.08	2.29
Small	1.35	1.45	1.66
Second grade:			
Extra large	1.94	2.03	2.24
Large	1.94	2.03	2.24
Medium	1.75	1.84	2.03
Small	1.28	1.38	1.59
Third grade:			
Unsized	.93	1.03	1.21
Under grade	.68	.77	.98
Other oranges:			
First grade:			
Extra large	2.24	2.33	2.52
Large	2.15	2.24	2.45
Medium	1.80	1.89	2.10
Small	1.12	1.21	1.42
Second grade:			
Extra large	1.94	2.03	2.24
Large	1.91	2.01	2.19
Medium	1.54	1.66	1.84
Small	1.05	1.17	1.35
Third grade:			
Unsized	.93	1.03	1.21
Under grade	.72	.84	1.03

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